

Energy Savings Opportunity Survey
Energy Engineering Analysis Program (EEAP)
Fort Campbell, Kentucky

Final Report - Phase II

*Volume 2
Sections 3 (continued) - 4*

CONTRACT # DACA27-93-C-0096
SYSTEMS/CORP PROJECT # 93006.01
NOVEMBER 24, 1993

SYSTEMS*corp*

SYSTEMS ENGINEERING AND MANAGEMENT CORPORATION



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Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 08:01:55

TITLE PAGE

ENERGY SAVINGS OPPORTUNITY SURVY
FT CAMPBELL, KY
ECO-6: BUILDING 6924

Contract No: 27-93-C-0096

Prepared By: Systems Corp
Estimator: Keith A. Derrington
Estimate Prep. Date: 09/30/93

Current UPB/CSI ID: ORL290

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Release 4.20

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6924E6

3-331

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6924

TIME 08:01:55

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Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
 ECO-6: BUILDING 6924
 1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 08:01:55

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL	QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16500 LIGHTING									
16512 7000 FLUORESCENT - RECESSED T8 ELECTRONIC BALLAST									
CD=3 EL 7003 4 FT 2 LAMP PARABOLIC LOUVRE W/ *** UNIT COSTS: ***	0.59				19.42	0.08	136.00	6.80	162.29
WC=1100 REFLECTOR 23.00 EA EELEB	14				447	2	3,128	156	3,733
TOTAL DIVISION 16 ELECTRICAL	14				447	2	3,128	156	3,733
TOTAL FACILITY AA. ELECTRICAL	14				447	2	3,128	156	3,733
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE	14				447	2	3,128	156	3,733
TOTAL BASE BID	14				447	2	3,128	156	3,733
TOTAL ADDITIVE	0				0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY	14				447	2	3,128	156	3,733

*** END OF DETAIL REPORT ***

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6924E6

3-333

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6924

TIME 08:01:55

PROJECT NOTES

SUMMARY PAGE 1

PROJECT NOTES

ECO-6: INTERIOR LIGHTING

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY INTERIOR LIGHTING IN
SELECTED FACILITIES AT FT CAMPBELL.

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6924E6
3-334

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6924

TIME 08:01:55

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY		COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHR FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL	1.00 EA	3,733	10.0% 373	0.0% 0	7.5% 308	2.5% 110	0.0% 0	4,524	4524.33
BID ITEM TOTAL		1.00 EA	3,733	373	0	308	110	0	4,524	4524.33
TOTAL BASE BID			3,733	373	0	308	110	0	4,524	
TOTAL ADDITIVE			0	0	0	0	0	0	0	
TOTAL INCL ADD			3,733	373	0	308	110	0	4,524	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6924E6

3-335

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6924

TIME 08:01:55

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY	UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00	EA	4,524		4,524	4524.30
TOTAL CURRENT CONTRACT COST				4,524	0	4,524	
Cost Growth from 09/93 to 09/94 Index Values: 0000 0000		0.0%		0	0	0	
ESCALATED CONTRACT COST				4,524	0	4,524	
Government-Furnished Property				0		0	
SUBTOTAL				4,524	0	4,524	
Contingencies		10.0%		452	0	452	
SUBTOTAL				4,977	0	4,977	
SIOH (S&A)		5.5%		274	0	274	
CURRENT WORKING ESTIMATE				5,250	0	5,250	

Estimated Construction Time 365 Days

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6924E6
3-336

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6924

TIME 08:01:55

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PH	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT	W/TX	AMOUNT	PCT	W/OH&P	SUBTOTAL
AA	GENERAL/PRIME		1.00	EA	14	447	2	3,284		3,733	100.0%	0	3,733
	TOTAL DIRECT				14	447	2	3,284		3,733	100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6924E6
3-337

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6924

TIME 08:01:55

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PH	SUBTOTAL	*** OVERHEAD *** AMOUNT	PCT	HOFC%	**** PROFIT **** AMOUNT	PCT	BOND%	OTHR%	***** TOTAL CONTRACT ***** AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		3,733	373	10.0%	0.0	308	7.5%	2.5%	0.0%	4,524	100.0%	4524.33
	TOTAL OVERHEAD & PROFIT			373	10.0%		308	7.5%					

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6924E6
3-338

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6924

TIME 08:01:55

SI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	14	447	2	3,128	156	3,733
TOTAL DIRECT	14	447	2	3,128	156	3,733

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6924E6
3-339

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6924

TIME 08:01:55

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	14	447	2	3,128	156	3,733
TOTAL DIRECT	14	447	2	3,128	156	3,733

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6924E6

3-340

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6924

TIME 08:01:55

EQUIPMENT SUMMARY

SUMMARY PAGE 8

EQUIP DESCRIPTION	LIFE HRS	TL HRLY	OWNRSH	OWNS	OVTM	OWNRSH	EXPENSE	HRLY	UPB	HOURS	TOTAL	COST
EMI20 SMALL TOOLS								1.40	1.40	1	2	
TOTAL PROJECT EQUIPMENT HOURS										1	2	

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6924

TIME 08:01:55

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	14	446
TOTAL PROJECT MANHOURS								14	446

*** END OF SUMMARY REPORT ***

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6924E6

3-342

FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

PAGE 1 OF 1

30 SEPTEMBER 1993

BUILDING WIDE FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 6924A

BUILDING USE:

HOURS/DAY 12
DAYS/WEEK 5

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH
DEMAND CHARGE \$11.78 PER KW

EXISTING FIXTURE DATA

4 FOOT

4 1 LAMP @ 48 W/FIXT = 192 WATTS
0 1 LAMP @ 37.8 W/FIXT = 0 WATTS
4 2 LAMP @ 96 W/FIXT = 384 WATTS
0 2 LAMP @ 75.6 W/FIXT = 0 WATTS
0 3 LAMP @ 144 W/FIXT = 0 WATTS
0 3 LAMP @ 113.4 W/FIXT = 0 WATTS
26 4 LAMP @ 192 W/FIXT = 4992 WATTS
0 4 LAMP @ 151.2 W/FIXT = 0 WATTS

2 FOOT

0 1 LAMP @ 31 W/FIXT = 0 WATTS
0 4 LAMP @ 88 W/FIXT = 0 WATTS
0 2 LAMP U @ 96 W/FIXT = 0 WATTS
0 2 LAMP U @ 75.6 W/FIXT = 0 WATTS

8 FOOT

0 2 LAMP @ 180 W/FIXT = 0 WATTS
0 2 LAMP @ 168 W/FIXT = 0 WATTS

REPLACEMENT FIXTURE DATA

4 FOOT

4 1 LAMP @ 37 W/FIXT = 148 WATTS
4 1 LAMP W/ REFLECTORS 37 W/FIXT = 148 WATTS
0 2 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS
26 2 LAMP W/ REFLECTORS 58 W/FIXT = 1508 WATTS

2 FOOT

0 1 LAMP @ 24 W/FIXT = 0 WATTS
0 2 LAMP W/ REFLECTORS 41 W/FIXT = 0 WATTS
0 2 LAMP U @ 58 W/FIXT = 0 WATTS

8 FOOT

0 1 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS

TOTAL EXISTING KW 5.57

TOTAL REPLACEMENT KW 1.80

BASELINE ENERGY CONSUMPTION 59.27 MBTU

REPLACEMENT ENERGY CONSUMPTION 19.20 MBTU

NET ENERGY SAVINGS 40.07 MBTU/YR

NET DOLLAR SAVINGS \$780.34

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 08:08:56

TITLE PAGE

ENERGY SAVINGS OPPORTUNITY SURVY
FT CAMPBELL, KY
ECO-6: BUILDING 6924A

Contract No: 27-93-C-0096

Prepared By: Systems Corp
Estimator: Keith A. Derrington
Estimate Prep. Date: 09/30/93
Current UPB/CSI ID: ORL290

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CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6924A6

3-344

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6924A

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Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS H-CACES
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
 ECO-6: BUILDING 6924A
 1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 08:08:56

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL	QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16500 LIGHTING									
16512 7000 FLUORESCENT - RECESSED T8 ELECTRONIC BALLAST									
CD=3 EL 7001 4 FT 1 LAMP PARABOLIC LOUVRE	***	UNIT COSTS: ***		0.57	18.86	0.07	105.25	5.26	129.45
WC=1100	4.00	EA EELEB	2	75	0	421	21	518	
CD=3 EL 7002 4 FT 1 LAMP PARABOLIC LOUVRE W/ REFLECTOR	***	UNIT COSTS: ***		0.54	17.84	0.07	122.00	6.10	146.01
WC=1100	4.00	EA EELEB	2	71	0	488	24	584	
CD=3 EL 7003 4 FT 2 LAMP PARABOLIC LOUVRE W/ REFLECTOR	***	UNIT COSTS: ***		0.59	19.42	0.08	136.00	6.80	162.29
WC=1100	26.00	EA EELEB	15	505	2	3,536	177	4,220	
TOTAL DIVISION 16 ELECTRICAL	20			652	3	4,445	222	5,321	
TOTAL FACILITY AA. ELECTRICAL	20			652	3	4,445	222	5,321	
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE	20			652	3	4,445	222	5,321	
TOTAL BASE BID	20			652	3	4,445	222	5,321	
TOTAL ADDITIVE	0			0	0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY	20			652	3	4,445	222	5,321	

*** END OF DETAIL REPORT ***

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6924A6

3-346

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6924A

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PROJECT NOTES

SUMMARY PAGE 1

PROJECT NOTES

ECO-6: INTERIOR LIGHTING

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY INTERIOR LIGHTING IN
SELECTED FACILITIES AT FT CAMPBELL.

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6924A6

3-347

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6924A

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BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY	COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHR FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL	1.00 EA	5,321	10.0% 532	0.0% 0	7.5% 439	2.5% 157	0.0% 0	6,450 6449.97
BID ITEM TOTAL	1.00 EA	5,321	532	0	439	157	0	6,450	6449.97
TOTAL BASE BID		5,321	532	0	439	157	0	6,450	
TOTAL ADDITIVE		0	0	0	0	0	0	0	
TOTAL INCL ADD		5,321	532	0	439	157	0	6,450	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6924A6

3-348

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6924A

TIME 08:08:56

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY	UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00	EA	6,450		6,450	6450.00
TOTAL CURRENT CONTRACT COST				6,450	0	6,450	
Cost Growth from 09/93 to 09/94 Index Values: 0000 0000		0.0%		0	0	0	
ESCALATED CONTRACT COST				6,450	0	6,450	
Government-Furnished Property				0		0	
SUBTOTAL				6,450	0	6,450	
Contingencies		10.0%		645	0	645	
SUBTOTAL				7,095	0	7,095	
SIOH (S&A)		5.5%		390	0	390	
CURRENT WORKING ESTIMATE				7,485	0	7,485	

Estimated Construction Time

365 Days

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6924A

TIME 08:08:56

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PM	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT W/TX	** TOTAL DIRECT **	SUBCON	W/OH&P	SUBTOTAL
									AMOUNT PCT			
AA	GENERAL/PRIME		1.00	EA	20	652	3	4,667	5,321 100.0%	0		5,321
	TOTAL DIRECT				20	652	3	4,667	5,321 100.0%			

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6924A6

3-350

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6924A

TIME 08:08:56

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PM	SUBTOTAL	*** OVERHEAD ***	AMOUNT	PCT	HOFC%	**** PROFIT ****	AMOUNT	PCT	BOND%	OTHR%	***** TOTAL CONTRACT *****	AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		5,321	532	10.0%	0.0		439	7.5%	2.5%	0.0%		6,450	100.0%		6449.97
	TOTAL OVERHEAD & PROFIT			532	10.0%			439	7.5%							

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6924A6

3-351

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6924A

TIME 08:08:56

CSI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	20	652	3	4,445	222	5,321
TOTAL DIRECT	20	652	3	4,445	222	5,321

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6924A6

3-352

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6924A

TIME 08:08:56

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	20	652	3	4,445	222	5,321
TOTAL DIRECT	20	652	3	4,445	222	5,321

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6924A6

3-353

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6924A

TIME 08:08:56

EQUIPMENT SUMMARY

SUMMARY PAGE 8

EQUIP DESCRIPTION	LIFE HRS	TL HRLY	OWNRSH	OWNS	OVTM	OWNRSH	EXPENSE	RATE	UPB	HOURS	TOTAL	COST
EMI20 SMALL TOOLS								1.40	1.40	2	3	
TOTAL PROJECT EQUIPMENT HOURS										2	3	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6924A6

3-354

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6924A

TIME 08:08:56

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	20	651
TOTAL PROJECT MANHOURS								20	651

*** END OF SUMMARY REPORT ***

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6924A6

3-355

FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 1 OF 2

BUILDING WIDE FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 6925

BUILDING USE:

HOURS/DAY 18

DAYS/WEEK 5

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$11.78 PER KW

EXISTING FIXTURE DATA

4 FOOT

0.1 LAMP @ 48 W/FIXT = 0 WATTS
 0.1 LAMP @ 37.8 W/FIXT = 0 WATTS
 5.2 LAMP @ 96 W/FIXT = 480 WATTS
 0.2 LAMP @ 75.6 W/FIXT = 0 WATTS
 0.3 LAMP @ 144 W/FIXT = 0 WATTS
 0.3 LAMP @ 113.4 W/FIXT = 0 WATTS
 16.4 LAMP @ 192 W/FIXT = 3072 WATTS
 0.4 LAMP @ 151.2 W/FIXT = 0 WATTS

2 FOOT

0.1 LAMP @ 31 W/FIXT = 0 WATTS
 0.4 LAMP @ 88 W/FIXT = 0 WATTS
 0.2 LAMP U @ 96 W/FIXT = 0 WATTS
 0.2 LAMP U @ 75.6 W/FIXT = 0 WATTS

8 FOOT

0.2 LAMP @ 180 W/FIXT = 0 WATTS
 0.2 LAMP @ 168 W/FIXT = 0 WATTS

TOTAL EXISTING KW 3.55

BASELINE ENERGY CONSUMPTION 56.71 MBTU

REPLACEMENT FIXTURE DATA

4 FOOT

0.1 LAMP @ 37 W/FIXT = 0 WATTS
 5.1 LAMP W/ REFLECTORS 37 W/FIXT = 185 WATTS
 0.2 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS
 16.2 LAMP W/ REFLECTORS 58 W/FIXT = 928 WATTS

2 FOOT

0.1 LAMP @ 24 W/FIXT = 0 WATTS
 0.2 LAMP W/ REFLECTORS 41 W/FIXT = 0 WATTS
 0.2 LAMP U @ 58 W/FIXT = 0 WATTS

8 FOOT

0.1 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS

TOTAL REPLACEMENT KW 1.11

REPLACEMENT ENERGY CONSUMPTION 17.77 MBTU

NET ENERGY SAVINGS 38.95 MBTU/YR

NET DOLLAR SAVINGS

\$586.08

FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 2 OF 2

BUILDING WIDE INCANDESCENT LAMP REPLACEMENT

BUILDING #: 6925

LAMP USE:

HOURS/DAY 5

DAYS/WEEK 5

PEAK USE 2 (1 - YES, 2 - NO)

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$0.00 PER KW

EXISTING INCANDESCENTS

0 LAMPS @ 25 WATTS =	0 WATTS
0 LAMPS @ 40 WATTS =	0 WATTS
2 LAMPS @ 52 WATTS =	104 WATTS
0 LAMPS @ 60 WATTS =	0 WATTS
0 LAMPS @ 75 WATTS =	0 WATTS
0 LAMPS @ 90 WATTS =	0 WATTS
0 LAMPS @ 100 WATTS =	0 WATTS
TOTAL EXISTING WATTS	104

BASELINE ENERGY CONSUMPTION 0.46 MBTU

REPLACEMENT ENERGY CONSUMPTION 0.12 MBTU

NET ENERGY SAVINGS 0.34 MBTU/YR

COMPACT FLUORESCENT REPLACEMENT

0 LAMPS @ 7 WATTS =	0 WATTS
0 LAMPS @ 9 WATTS =	0 WATTS
2 LAMPS @ 13 WATTS =	26 WATTS
0 LAMPS @ 18 WATTS =	0 WATTS
0 LAMPS @ 26 WATTS =	0 WATTS
TOTAL REPLACEMENT WATTS	26

REPLACEMENT ENERGY CONSUMPTION 0.12 MBTU

NET DOLLAR SAVINGS \$2.14

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 08:16:01

TITLE PAGE

ENERGY SAVINGS OPPORTUNITY SURVY
FT CAMPBELL, KY
ECO-6: BUILDING 6925

Contract No: 27-93-C-0096

Prepared By: Systems Corp
Estimator: Keith A. Derrington
Estimate Prep. Date: 09/30/93
Current UPB/CSI ID: ORL290

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Release 4.20

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6925E6

3-358

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6925

TIME 08:16:01

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DETAILED ESTIMATE	DETAIL PAGE
1. BUILDING TO THE 5 FOOT LINE	
AA. ELECTRICAL.....	1

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Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6925
1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 08:16:01

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL		QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$

16500 LIGHTING										
16512 6100 SMALL FL FIXTURES (LESS THAN 40 WATT LAMPS)										
CD=3 EL 6105	SURF SQ W/1 13W BIAxIAL FL LAMP	***	UNIT COSTS: ***	1.25		41.26	0.00	27.80	1.39	70.45
WC=1100	WHITE ACRYLIC LENS	2.00	EA EELEA	3		83	0	56	3	141
16512 7000 FLUORESCENT - RECESSED T8 ELECTRONIC BALLAST										
CD=3 EL 7002	4 FT 1 LAMP PARABOLIC LOUVRE W/	***	UNIT COSTS: ***	0.54		17.84	0.07	122.00	6.10	146.01
WC=1100	REFLECTOR	5.00	EA EELEB	3		89	0	610	31	730
CD=3 EL 7003	4 FT 2 LAMP PARABOLIC LOUVRE W/	***	UNIT COSTS: ***	0.59		19.42	0.08	136.00	6.80	162.29
WC=1100	REFLECTOR	16.00	EA EELEB	9		311	1	2,176	109	2,597
TOTAL DIVISION 16 ELECTRICAL					15	482	2	2,842	142	3,468
TOTAL FACILITY AA. ELECTRICAL					15	482	2	2,842	142	3,468
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE					15	482	2	2,842	142	3,468
TOTAL BASE BID					15	482	2	2,842	142	3,468
TOTAL ADDITIVE					0	0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY					15	482	2	2,842	142	3,468

*** END OF DETAIL REPORT ***

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6925E6

3-360

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6925

TIME 08:16:01

PROJECT NOTES

SUMMARY PAGE 1

PROJECT NOTES

ECO-6: INTERIOR LIGHTING

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY INTERIOR LIGHTING IN
SELECTED FACILITIES AT FT CAMPBELL.

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6925E6

3-361

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6925

TIME 08:16:01

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY		COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHR FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL			10.0%	0.0%	7.5%	2.5%	0.0%		
		1.00 EA	3,468	347	0	286	103	0	4,203	4203.03
BID ITEM TOTAL		1.00 EA	3,468	347	0	286	103	0	4,203	4203.03
TOTAL BASE BID			3,468	347	0	286	103	0	4,203	
TOTAL ADDITIVE			0	0	0	0	0	0	0	
TOTAL INCL ADD			3,468	347	0	286	103	0	4,203	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6925E6

3-362

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6925

TIME 08:16:01

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY	UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00	EA	4,203		4,203	4203.00
	TOTAL CURRENT CONTRACT COST			4,203	0	4,203	
	Cost Growth from 09/93 to 09/94 Index Values: 0000 0000	0.0%		0	0	0	
	ESCALATED CONTRACT COST			4,203	0	4,203	
	Government-Furnished Property			0		0	
	SUBTOTAL			4,203	0	4,203	
	Contingencies	10.0%		420	0	420	
	SUBTOTAL			4,623	0	4,623	
	SIOH (S&A)	5.5%		254	0	254	
	CURRENT WORKING ESTIMATE			4,878	0	4,878	
	Estimated Construction Time	365	Days				

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6925E6

3-363

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6925

TIME 08:16:01

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PH	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT	W/TX	AMOUNT	PCT	W/OH&P	SUBTOTAL
AA	GENERAL/PRIME		1.00	EA	15	482	2	2,984		3,468	100.0%	0	3,468
	TOTAL DIRECT				15	482	2	2,984		3,468	100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6925E6
3-364

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6925

TIME 08:16:01

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PH	SUBTOTAL	AMOUNT	PCT	HOFC%	AMOUNT	PCT	BOND%	OTHR%	AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		3,468	347	10.0%	0.0	286	7.5%	2.5%	0.0%	4,203	100.0%	4203.03
	TOTAL OVERHEAD & PROFIT			347	10.0%		286	7.5%					

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6925E6

3-365

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6925

TIME 08:16:01

CSI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	15	482	2	2,842	142	3,468
TOTAL DIRECT	15	482	2	2,842	142	3,468

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6925E6

3-366

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6925

TIME 08:16:01

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	15	482	2	2,842	142	3,468
TOTAL DIRECT	15	482	2	2,842	142	3,468

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6925E6

3-367

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6925

TIME 08:16:01

EQUIPMENT SUMMARY

SUMMARY PAGE 8

EQUIP DESCRIPTION	LIFE HRS	TL	HRLY	OWNRSH	OWNS	OVTM	OWNRSH	EXPENSE	RATE	RATE	HOURS	COST
EMI20 SMALL TOOLS									1.40	1.40	1	2
TOTAL PROJECT EQUIPMENT HOURS											1	2

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6925

TIME 08:16:01

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTH	TXS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	15	482
TOTAL PROJECT MANHOURS								15	482

*** END OF SUMMARY REPORT ***

FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 1 OF 3

BUILDING WIDE FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 6926

BUILDING USE:

HOURS/DAY 12

DAYS/WEEK 5

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$11.78 PER KW

EXISTING FIXTURE DATA

4 FOOT

0 1 LAMP @	48 W/FIXT =	0 WATTS
0 1 LAMP @	37.8 W/FIXT =	0 WATTS
0 2 LAMP @	96 W/FIXT =	0 WATTS
0 2 LAMP @	75.6 W/FIXT =	0 WATTS
0 3 LAMP @	144 W/FIXT =	0 WATTS
0 3 LAMP @	113.4 W/FIXT =	0 WATTS
13 4 LAMP @	192 W/FIXT =	2496 WATTS
8 4 LAMP @	151.2 W/FIXT =	1209 WATTS

2 FOOT

0 1 LAMP @	31 W/FIXT =	0 WATTS
0 4 LAMP @	88 W/FIXT =	0 WATTS
0 2 LAMP U @	96 W/FIXT =	0 WATTS
0 2 LAMP U @	75.6 W/FIXT =	0 WATTS

8 FOOT

0 2 LAMP @	180 W/FIXT =	0 WATTS
0 2 LAMP @	168 W/FIXT =	0 WATTS

REPLACEMENT FIXTURE DATA

4 FOOT

0 1 LAMP @	37 W/FIXT =	0 WATTS
0 1 LAMP W/ REFLECTORS	37 W/FIXT =	0 WATTS
0 2 LAMP W/ REFLECTORS	58 W/FIXT =	0 WATTS
21 2 LAMP W/ REFLECTORS	58 W/FIXT =	1218 WATTS

2 FOOT

0 1 LAMP @	24 W/FIXT =	0 WATTS
0 2 LAMP W/ REFLECTORS	41 W/FIXT =	0 WATTS
0 2 LAMP U @	58 W/FIXT =	0 WATTS

8 FOOT

0 1 LAMP W/ REFLECTORS	58 W/FIXT =	0 WATTS
---------------------------	-------------	---------

TOTAL EXISTING KW 3.71

TOTAL REPLACEMENT KW 1.22

BASELINE ENERGY CONSUMPTION 39.44 MBTU

REPLACEMENT ENERGY CONSUMPTION 12.97 MBTU

NET ENERGY SAVINGS 26.48 MBTU/YR

NET DOLLAR SAVINGS \$515.72

FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 2 OF 3

OVERLIT AREA FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 6926
AREA: CONFERENCE ROOM AND OFFICE

AREA USE:
HOURS/DAY 12
DAYS/WEEK 5

ELECTRIC COSTS:
ENERGY CHARGE \$0.0211 PER KWH
DEMAND CHARGE \$11.78 PER KW

EXISTING FIXTURE DATA

4 FOOT

1 LAMP @ 48 W/FIXT = 0 WATTS
1 LAMP @ 37.8 W/FIXT = 0 WATTS
2 LAMP @ 96 W/FIXT = 0 WATTS
2 LAMP @ 75.6 W/FIXT = 0 WATTS
3 LAMP @ 144 W/FIXT = 0 WATTS
3 LAMP @ 113.4 W/FIXT = 0 WATTS
4 LAMP @ 192 W/FIXT = 0 WATTS
3 4 LAMP @ 151.2 W/FIXT = 453.6 WATTS

2 FOOT

1 LAMP @ 31 W/FIXT = 0 WATTS
4 LAMP @ 88 W/FIXT = 0 WATTS
2 LAMP U @ 96 W/FIXT = 0 WATTS
2 LAMP U @ 75.6 W/FIXT = 0 WATTS

8 FOOT

2 LAMP @ 180 W/FIXT = 0 WATTS
2 LAMP @ 168 W/FIXT = 0 WATTS

REPLACEMENT FIXTURE DATA

4 FOOT

0.1 LAMP @ 37 W/FIXT = 0 WATTS
0.1 LAMP @ 37 W/FIXT = 0 WATTS
0.2 LAMP @ 58 W/FIXT = 0 WATTS
3 2 LAMP @ 58 W/FIXT = 174 WATTS

2 FOOT

0.1 LAMP @ 24 W/FIXT = 0 WATTS
0.2 LAMP @ 41 W/FIXT = 0 WATTS
0.2 LAMP U @ 58 W/FIXT = 0 WATTS

8 FOOT

0.1 LAMP @ 58 W/FIXT = 0 WATTS

TOTAL EXISTING KW 0.453

TOTAL REPLACEMENT KW 0.174

BASELINE ENERGY CONSUMPTION 4.83 MBTU

REPLACEMENT ENERGY CONSUMPTION 1.85 MBTU

NET ENERGY SAVINGS 2.97 MBTU/YR

NET DOLLAR SAVINGS \$57.97

FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 3 OF 3

BUILDING WIDE INCANDESCENT LAMP REPLACEMENT

BUILDING #: 6926

LAMP USE:

HOURS/DAY 12

DAYS/WEEK 5

PEAK USE 1 (1-YES, 2-NO)

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$11.78 PER KW

EXISTING INCANDESCENTS

0 LAMPS @ 25 WATTS =	0 WATTS
0 LAMPS @ 40 WATTS =	0 WATTS
2 LAMPS @ 52 WATTS =	104 WATTS
0 LAMPS @ 60 WATTS =	0 WATTS
0 LAMPS @ 75 WATTS =	0 WATTS
0 LAMPS @ 90 WATTS =	0 WATTS
0 LAMPS @ 100 WATTS =	0 WATTS

TOTAL EXISTING WATTS 104

BASELINE ENERGY CONSUMPTION 1.11 MBTU

COMPACT FLUORESCENT REPLACEMENT

0 LAMPS @ 7 WATTS =	0 WATTS
0 LAMPS @ 9 WATTS =	0 WATTS
2 LAMPS @ 13 WATTS =	26 WATTS
0 LAMPS @ 18 WATTS =	0 WATTS
0 LAMPS @ 26 WATTS =	0 WATTS

TOTAL REPLACEMENT WATTS 26

REPLACEMENT ENERGY CONSUMPTION 0.28 MBTU

NET ENERGY SAVINGS 0.83 MBTU/YR

NET DOLLAR SAVINGS \$16.17

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 08:29:15

TITLE PAGE

ENERGY SAVINGS OPPORTUNITY SURVY
FT CAMPBELL, KY
ECO-6: BUILDING 6926

Contract No: 27-93-C-0096

Prepared By: Systems Corp
Estimator: Keith A. Derrington
Estimate Prep. Date: 09/30/93

Current UPB/CSI ID: ORL290

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CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6926E6
3-373

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6926

TIME 08:29:15

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DETAILED ESTIMATE

DETAIL PAGE

1. BUILDING TO THE 5 FOOT LINE	
AA. ELECTRICAL.....	1

* * * END TABLE OF CONTENTS * * *

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
 ECO-6: BUILDING 6926
 1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 08:29:15

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL	QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
------------------------	----------	-----	------	-------	-------	-----------	----------	---------	-----------

16500 LIGHTING

16512 6100 SMALL FL FIXTURES (LESS THAN 40 WATT LAMPS)

CD=3 EL 6105	SURF SQ W/1 13W BIAXIAL FL LAMP	*** UNIT COSTS: ***	1.25	41.26	0.00	27.80	1.39	70.45
WC=1100	WHITE ACRYLIC LENS	2.00 EA EELEA	3	83	0	56	3	141

16512 7000 FLUORESCENT - RECESSED T8 ELECTRONIC BALLAST

CD=3 EL 7003	4 FT 2 LAMP PARABOLIC LOUVRE W/	*** UNIT COSTS: ***	0.59	19.42	0.08	136.00	6.80	162.29
WC=1100	REFLECTOR	21.00 EA EELEB	12	408	2	2,856	143	3,408

CD=3 EL 7008	4 FT 2 LAMP PARABOLIC LOUVRE	*** UNIT COSTS: ***	0.50	16.51	0.06	120.00	6.00	142.57
WC=1100		3.00 EA EELEB	2	50	0	360	18	428

TOTAL DIVISION 16 ELECTRICAL	16	540	2	3,272	164	3,977
------------------------------	----	-----	---	-------	-----	-------

TOTAL FACILITY AA. ELECTRICAL	16	540	2	3,272	164	3,977
-------------------------------	----	-----	---	-------	-----	-------

TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE	16	540	2	3,272	164	3,977
---	----	-----	---	-------	-----	-------

TOTAL BASE BID	16	540	2	3,272	164	3,977
----------------	----	-----	---	-------	-----	-------

TOTAL ADDITIVE	0	0	0	0	0	0
----------------	---	---	---	---	---	---

TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY	16	540	2	3,272	164	3,977
---	----	-----	---	-------	-----	-------

*** END OF DETAIL REPORT ***

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6926E6

3-375

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6926

TIME 08:29:15

PROJECT NOTES

SUMMARY PAGE 1

PROJECT NOTES

ECO-6: INTERIOR LIGHTING

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY INTERIOR LIGHTING IN
SELECTED FACILITIES AT FT CAMPBELL.

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6926E6

3-376

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6926

TIME 08:29:15

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY	COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHR FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL	1.00 EA	3,977	10.0% 398	0.0% 0	7.5% 328	2.5% 118	0.0% 0	4,820 4820.11
BID ITEM TOTAL	1.00 EA	3,977	398	0	328	118	0	4,820	4820.11
TOTAL BASE BID		3,977	398	0	328	118	0	4,820	
TOTAL ADDITIVE		0	0	0	0	0	0	0	
TOTAL INCL ADD		3,977	398	0	328	118	0	4,820	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6926E6

3-377

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6926

TIME 08:29:15

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00 EA	4,820		4,820	4820.10
	TOTAL CURRENT CONTRACT COST		4,820	0	4,820	
	Cost Growth from 09/93 to 09/94 Index Values: 0000 0000	0.0%	0	0	0	
	ESCALATED CONTRACT COST		4,820	0	4,820	
	Government-Furnished Property		0		0	
	SUBTOTAL		4,820	0	4,820	
	Contingencies	10.0%	482	0	482	
	SUBTOTAL		5,302	0	5,302	
	SIOH (S&A)	5.5%	292	0	292	
	CURRENT WORKING ESTIMATE		5,594	0	5,594	

Estimated Construction Time 365 Days

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6926E6

3-378

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6926

TIME 08:29:15

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PH	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT W/TX	AMOUNT	PCT	W/OH&P	SUBTOTAL
AA	GENERAL/PRIME		1.00	EA	16	540	2	3,435	3,977	100.0%	0	3,977
	TOTAL DIRECT				16	540	2	3,435	3,977	100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6926E6

3-379

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6926

TIME 08:29:15

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID CONTRACTOR		PH	SUBTOTAL	*** OVERHEAD ***			**** PROFIT ****			***** TOTAL CONTRACT *****			
				AMOUNT	PCT	HOFC%	AMOUNT	PCT	BOND%	OTHR%	AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		3,977	398	10.0%	0.0	328	7.5%	2.5%	0.0%	4,820	100.0%	4820.10
				-----			-----						
TOTAL OVERHEAD & PROFIT				398	10.0%		328	7.5%					

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6926E6

3-380

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6926

TIME 08:29:15

CSI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	16	540	2	3,272	164	3,977
TOTAL DIRECT	16	540	2	3,272	164	3,977

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6926E6

3-381

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6926

TIME 08:29:15

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	16	540	2	3,272	164	3,977
TOTAL DIRECT	16	540	2	3,272	164	3,977

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6926E6

3-382

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6926

TIME 08:29:15

EQUIPMENT SUMMARY

SUMMARY PAGE 8

EQUIP DESCRIPTION	LIFE HRS	TL HRLY	OWNRSH	OWNS	OVTM	OWNRSH	EXPENSE	RATE	UPB	HOURS	TOTAL	COST
EMI20 SMALL TOOLS								1.40	1.40	1	2	
TOTAL PROJECT EQUIPMENT HOURS										1	2	

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6926

TIME 08:29:15

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	16	540
TOTAL PROJECT MANHOURS								16	540

* * * END OF SUMMARY REPORT * * *

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6926E6

3-384

FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

PAGE 1 OF 2

30 SEPTEMBER 1993

BUILDING WIDE FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 6932

BUILDING USE:

HOURS/DAY 12

DAYS/WEEK 5

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$11.78 PER KW

EXISTING FIXTURE DATA

4 FOOT

0.1 LAMP @ 48 W/FIXT = 0 WATTS
 0.1 LAMP @ 37.8 W/FIXT = 0 WATTS
 0.2 LAMP @ 96 W/FIXT = 0 WATTS
 0.2 LAMP @ 75.6 W/FIXT = 0 WATTS
 0.3 LAMP @ 144 W/FIXT = 0 WATTS
 0.3 LAMP @ 113.4 W/FIXT = 0 WATTS
 0.4 LAMP @ 192 W/FIXT = 0 WATTS
 24.4 LAMP @ 151.2 W/FIXT = 3628. WATTS

2 FOOT

0.1 LAMP @ 31 W/FIXT = 0 WATTS
 0.4 LAMP @ 88 W/FIXT = 0 WATTS
 0.2 LAMP U @ 96 W/FIXT = 0 WATTS
 0.2 LAMP U @ 75.6 W/FIXT = 0 WATTS

8 FOOT

0.2 LAMP @ 180 W/FIXT = 0 WATTS
 0.2 LAMP @ 168 W/FIXT = 0 WATTS

TOTAL EXISTING KW 3.63

BASELINE ENERGY CONSUMPTION 38.63 MBTU

NET ENERGY SAVINGS 23.81 MBTU/YR

REPLACEMENT FIXTURE DATA

4 FOOT

0.1 LAMP @ 37 W/FIXT = 0 WATTS
 0.1 LAMP W/ REFLECTORS 37 W/FIXT = 0 WATTS
 0.2 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS
 24.2 LAMP W/ REFLECTORS 58 W/FIXT = 1392 WATTS

2 FOOT

0.1 LAMP @ 24 W/FIXT = 0 WATTS
 0.2 LAMP W/ REFLECTORS 41 W/FIXT = 0 WATTS
 0.2 LAMP U @ 58 W/FIXT = 0 WATTS

8 FOOT

0.1 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS

TOTAL REPLACEMENT KW 1.39

REPLACEMENT ENERGY CONSUMPTION 14.82 MBTU

NET DOLLAR SAVINGS \$469.73

FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 2 OF 2

BUILDING WIDE INCANDESCENT LAMP REPLACEMENT

BUILDING #: 6932

LAMP USE:

HOURS/DAY 5

DAYS/WEEK 5

PEAK USE 2 (1-YES, 2-NO)

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$0.00 PER KW

EXISTING INCANDESCENTS

0 LAMPS @	25 WATTS =	0 WATTS
0 LAMPS @	40 WATTS =	0 WATTS
0 LAMPS @	52 WATTS =	0 WATTS
0 LAMPS @	60 WATTS =	0 WATTS
0 LAMPS @	75 WATTS =	0 WATTS
0 LAMPS @	90 WATTS =	0 WATTS
1 LAMPS @	100 WATTS =	100 WATTS

TOTAL EXISTING WATTS 100

BASELINE ENERGY CONSUMPTION 0.44 MBTU

COMPACT FLUORESCENT REPLACEMENT

0 LAMPS @	7 WATTS =	0 WATTS
0 LAMPS @	9 WATTS =	0 WATTS
0 LAMPS @	13 WATTS =	0 WATTS
0 LAMPS @	18 WATTS =	0 WATTS
1 LAMPS @	26 WATTS =	26 WATTS

TOTAL REPLACEMENT WATTS 26

REPLACEMENT ENERGY CONSUMPTION 0.12 MBTU

NET ENERGY SAVINGS 0.32 MBTU/YR

NET DOLLAR SAVINGS \$2.03

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 08:38:18

TITLE PAGE

ENERGY SAVINGS OPPORTUNITY SURVY
FT CAMPBELL, KY
ECO-6: BUILDING 6932

Contract No: 27-93-C-0096

Prepared By: Systems Corp
Estimator: Keith A. Derrington
Estimate Prep. Date: 09/30/93

Current UPB/CSI ID: ORL290

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CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6932E6

3-387

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
 ECO-6: BUILDING 6932
 1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 08:38:18

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL	QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16500 LIGHTING									
16512 6100 SMALL FL FIXTURES (LESS THAN 40 WATT LAMPS)									
CD=3 EL 6107 SURF SQ W/1 26W BIAxIAL FL LAMP *** UNIT COSTS: ***	1.25				41.26	0.00	31.00	1.55	73.81
WC=1100 WHITE ACRYLIC LENS 1.00 EA EELEA	1				41	0	31	2	74
16512 7000 FLUORESCENT - RECESSED T8 ELECTRONIC BALLAST									
CD=3 EL 7003 4 FT 2 LAMP PARABOLIC LOUVRE W/ *** UNIT COSTS: ***	0.59				19.42	0.08	136.00	6.80	162.29
WC=1100 REFLECTOR 24.00 EA EELEB	14				466	2	3,264	163	3,895
TOTAL DIVISION 16 ELECTRICAL	15				507	2	3,295	165	3,969
TOTAL FACILITY AA. ELECTRICAL	15				507	2	3,295	165	3,969
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE	15				507	2	3,295	165	3,969
TOTAL BASE BID	15				507	2	3,295	165	3,969
TOTAL ADDITIVE	0				0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY	15				507	2	3,295	165	3,969

*** END OF DETAIL REPORT ***

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6932E6

3-388

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6932

TIME 08:38:18

PROJECT NOTES

SUMMARY PAGE 1

PROJECT NOTES

ECO-6: INTERIOR LIGHTING

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY INTERIOR LIGHTING IN
SELECTED FACILITIES AT FT CAMPBELL.

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6932E6
3-389

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6932

TIME 08:38:18

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY		COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHER FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL	1.00 EA	3,969	10.0% 397	0.0% 0	7.5% 327	2.5% 117	0.0% 0	4,810	4810.49
BID ITEM TOTAL		1.00 EA	3,969	397	0	327	117	0	4,810	4810.49
TOTAL BASE BID			3,969	397	0	327	117	0	4,810	
TOTAL ADDITIVE			0	0	0	0	0	0	0	
TOTAL INCL ADD			3,969	397	0	327	117	0	4,810	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6932E6

3-390

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6932

TIME 08:38:18

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY	UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00	EA	4,811		4,811	4810.50
TOTAL CURRENT CONTRACT COST				4,811	0	4,811	
Cost Growth from 09/93 to 09/94 Index Values: 0000 0000		0.0%		0	0	0	
ESCALATED CONTRACT COST				4,811	0	4,811	
Government-Furnished Property				0		0	
SUBTOTAL				4,811	0	4,811	
Contingencies		10.0%		481	0	481	
SUBTOTAL				5,292	0	5,292	
SIOH (S&A)		5.5%		291	0	291	
CURRENT WORKING ESTIMATE				5,583	0	5,583	

Estimated Construction Time 365 Days

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6932E6

3-391

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6932

TIME 08:38:18

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PM	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT	W/TX	** TOTAL DIRECT *	* SUBCON *	W/OH&P	SUBTOTAL
										AMOUNT	PCT		
AA	GENERAL/PRIME		1.00	EA	15	507	2	3,460		3,969	100.0%	0	3,969
	TOTAL DIRECT				15	507	2	3,460		3,969	100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6932E6

3-392

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6932

TIME 08:38:18

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

-----		*** OVERHEAD ***			-----			**** PROFIT ****			-----			***** TOTAL CONTRACT *****		
ID	CONTRACTOR	PH	SUBTOTAL	AMOUNT	PCT	HOFC%	AMOUNT	PCT	BOND%	OTHR%	AMOUNT	PCT	UNIT	COST		
AA	GENERAL/PRIME		3,969	397	10.0%	0.0	327	7.5%	2.5%	0.0%	4,811	100.0%	4810.50			
				-----			-----									
				397	10.0%		327	7.5%								
			TOTAL OVERHEAD & PROFIT													

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6932E6

3-393

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6932

TIME 08:38:18

SI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	15	507	2	3,295	165	3,969
TOTAL DIRECT	15	507	2	3,295	165	3,969

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6932E6

3-394

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6932

TIME 08:38:18

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	15	507	2	3,295	165	3,969
TOTAL DIRECT	15	507	2	3,295	165	3,969

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6932E6

3-395

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6932

TIME 08:38:18

EQUIPMENT SUMMARY

SUMMARY PAGE 8

EQUIP DESCRIPTION	LIFE HRS	TL	HRLY	OWNRSH	OWNS	OVTM	OWNRSH	EXPENSE	HRLY	UPB	HOURS	TOTAL	COST
EMI20 SMALL TOOLS									1.40	1.40	1	2	
TOTAL PROJECT EQUIPMENT HOURS											1	2	

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6932

TIME 08:38:18

LABOR SUMMARY

SUMMARY PAGE 9

CR27

HRLY -- UPB **** TOTAL ****-----

FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

PAGE 1 OF 2

30 SEPTEMBER 1993

BUILDING WIDE FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 6933

BUILDING USE:

HOURS/DAY 8

DAYS/WEEK 6

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$11.78 PER KW

EXISTING FIXTURE DATA

4 FOOT

0 1 LAMP @ 48 W/FIXT = 0 WATTS
 0 1 LAMP @ 37.8 W/FIXT = 0 WATTS
 8 2 LAMP @ 96 W/FIXT = 768 WATTS
 0 2 LAMP @ 75.6 W/FIXT = 0 WATTS
 0 3 LAMP @ 144 W/FIXT = 0 WATTS
 0 3 LAMP @ 113.4 W/FIXT = 0 WATTS
 0 4 LAMP @ 192 W/FIXT = 0 WATTS
 0 4 LAMP @ 151.2 W/FIXT = 0 WATTS

2 FOOT

0 1 LAMP @ 31 W/FIXT = 0 WATTS
 0 4 LAMP @ 88 W/FIXT = 0 WATTS
 0 2 LAMP U @ 96 W/FIXT = 0 WATTS
 0 2 LAMP U @ 75.6 W/FIXT = 0 WATTS

8 FOOT

0 2 LAMP @ 180 W/FIXT = 0 WATTS
 0 2 LAMP @ 168 W/FIXT = 0 WATTS

TOTAL EXISTING KW 0.77

BASELINE ENERGY CONSUMPTION 6.540 MBTU

NET ENERGY SAVINGS 4.02 MBTU/YR

REPLACEMENT FIXTURE DATA

4 FOOT

0 1 LAMP @ 37 W/FIXT = 0 WATTS
 8 1 LAMP W/ REFLECTORS 37 W/FIXT = 296 WATTS
 0 2 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS
 0 2 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS

2 FOOT

0 1 LAMP @ 24 W/FIXT = 0 WATTS
 0 2 LAMP W/ REFLECTORS 41 W/FIXT = 0 WATTS
 0 2 LAMP U @ 58 W/FIXT = 0 WATTS

8 FOOT

0 1 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS

TOTAL REPLACEMENT KW 0.30

REPLACEMENT ENERGY CONSUMPTION 2.52 MBTU

NET DOLLAR SAVINGS \$91.63

FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 2 OF 2

BUILDING WIDE INCANDESCENT LAMP REPLACEMENT

BUILDING #: 6933

LAMP USE:

HOURS/DAY 8

DAYS/WEEK 6

PEAK USE 1 (1-YES, 2-NO)

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$11.78 PER KW

EXISTING INCANDESCENTS

0 LAMPS @	25 WATTS =	0 WATTS
0 LAMPS @	40 WATTS =	0 WATTS
3 LAMPS @	52 WATTS =	156 WATTS
8 LAMPS @	60 WATTS =	480 WATTS
0 LAMPS @	75 WATTS =	0 WATTS
0 LAMPS @	90 WATTS =	0 WATTS
14 LAMPS @	100 WATTS =	1400 WATTS

COMPACT FLUORESCENT REPLACEMENT

0 LAMPS @	7 WATTS =	0 WATTS
0 LAMPS @	9 WATTS =	0 WATTS
11 LAMPS @	13 WATTS =	143 WATTS
0 LAMPS @	18 WATTS =	0 WATTS
14 LAMPS @	26 WATTS =	364 WATTS

TOTAL EXISTING WATTS 2036

TOTAL REPLACEMENT WATTS 507

BASELINE ENERGY CONSUMPTION 17.34 MBTU

REPLACEMENT ENERGY CONSUMPTION 4.32 MBTU

NET ENERGY SAVINGS 13.0 MBTU/YR

NET DOLLAR SAVINGS \$296.82

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 09:09:32

TITLE PAGE

ENERGY SAVINGS OPPORTUNITY SURVY
FT CAMPBELL, KY
ECO-6: BUILDING 6933

Contract No: 27-93-C-0096

Prepared By: Systems Corp
Estimator: Keith A. Derrington
Estimate Prep. Date: 09/30/93
Current UPB/CSI ID: ORL290

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CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6933E6
3-400

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6933

TIME 09:09:32

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DETAILED ESTIMATE	DETAIL PAGE
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1. BUILDING TO THE 5 FOOT LINE	
AA. ELECTRICAL.....	1

* * * END TABLE OF CONTENTS * * *

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
 ECO-6: BUILDING 6933
 1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 09:09:32

TAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL		QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16500 LIGHTING										
16512 6100 SMALL FL FIXTURES (LESS THAN 40 WATT LAMPS)										
CD=3 EL 6105	SURF SQ W/1 13W BIAXIAL FL LAMP	***	UNIT COSTS: ***	1.25	41.26	0.00	27.80	1.39	70.45	
WC=1100	WHITE ACRYLIC LENS	11.00	EA EELEA	14	454	0	306	15	775	
CD=3 EL 6107	SURF SQ W/1 26W BIAXIAL FL LAMP	***	UNIT COSTS: ***	1.25	41.26	0.00	31.00	1.55	73.81	
WC=1100	WHITE ACRYLIC LENS	14.00	EA EELEA	18	578	0	434	22	1,033	
16512 7000 FLUORESCENT - RECESSED T8 ELECTRONIC BALLAST										
CD=3 EL 7002	4 FT 1 LAMP PARABOLIC LOUVRE W/	***	UNIT COSTS: ***	0.54	17.84	0.07	122.00	6.10	146.01	
WC=1100	REFLECTOR	8.00	EA EELEB	4	143	1	976	49	1,168	
TOTAL DIVISION 16 ELECTRICAL					36	1,174	1	1,716	86	2,976
TOTAL FACILITY AA. ELECTRICAL					36	1,174	1	1,716	86	2,976
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE					36	1,174	1	1,716	86	2,976
TOTAL BASE BID					36	1,174	1	1,716	86	2,976
TOTAL ADDITIVE					0	0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY					36	1,174	1	1,716	86	2,976

*** END OF DETAIL REPORT ***

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6933E6

3-402

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6933

TIME 09:09:32

PROJECT NOTES

SUMMARY PAGE 1

PROJECT NOTES

ECO-6: INTERIOR LIGHTING

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY INTERIOR LIGHTING IN
SELECTED FACILITIES AT FT CAMPBELL.

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6933E6

3-403

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
 ECO-6: BUILDING 6933

TIME 09:09:32

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY	COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHER FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL	1.00 EA	2,976	10.0% 298	0.0% 0	7.5% 246	2.5% 88	0.0% 0	3,608 3607.66
BID ITEM TOTAL	1.00 EA	2,976	298	0	246	88	0	3,608	3607.66
TOTAL BASE BID		2,976	298	0	246	88	0	3,608	
TOTAL ADDITIVE		0	0	0	0	0	0	0	
TOTAL INCL ADD		2,976	298	0	246	88	0	3,608	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6933E6

3-404

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6933

TIME 09:09:32

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY	UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00	EA	3,608		3,608	3607.70
	TOTAL CURRENT CONTRACT COST			3,608	0	3,608	
	Cost Growth from 09/93 to 09/94 Index Values: 0000 0000	0.0%		0	0	0	
	ESCALATED CONTRACT COST			3,608	0	3,608	
	Government-Furnished Property			0		0	
	SUBTOTAL			3,608	0	3,608	
	Contingencies	10.0%		361	0	361	
	SUBTOTAL			3,968	0	3,968	
	SIOH (S&A)	5.5%		218	0	218	
	CURRENT WORKING ESTIMATE			4,187	0	4,187	

Estimated Construction Time

365 Days

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6933E6

3-405

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS H-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6933

TIME 09:09:32

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PM	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT	W/TX	** TOTAL DIRECT *	* SUBCON *	W/OH&P	SUBTOTAL
										AMOUNT	PCT		
AA	GENERAL/PRIME		1.00	EA	36	1,174	1	1,802		2,976	100.0%	0	2,976
	TOTAL DIRECT				36	1,174	1	1,802		2,976	100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6933E6

3-406

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6933

TIME 09:09:32

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PH	SUBTOTAL	*** OVERHEAD ***	AMOUNT	PCT	HOFC%	**** PROFIT ****	AMOUNT	PCT	BOND%	OTHR%	***** TOTAL CONTRACT *****	AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		2,976	298	10.0%	0.0		246	7.5%	2.5%	0.0%		3,608	100.0%		3607.65
	TOTAL OVERHEAD & PROFIT			298	10.0%			246	7.5%							

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6933E6

3-407

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6933

TIME 09:09:32

SI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	36	1,174	1	1,716	86	2,976
TOTAL DIRECT	36	1,174	1	1,716	86	2,976

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6933E6

3-408

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6933

TIME 09:09:32

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	36	1,174	1	1,716	86	2,976
TOTAL DIRECT	36	1,174	1	1,716	86	2,976

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6933E6

3-409

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6933

TIME 09:09:32

EQUIPMENT SUMMARY

SUMMARY PAGE 8

----- *** BOOK VALUE ***		ADJ FACTOR	ADJUSTD	BOOK OF	-- HRLY	--- UPB	**** TOTAL ****						
EQUIP	DESCRIPTION	LIFE HRS	TL HRLY	OWNRSH	OWNS	OVTM	OWNRSH	EXPENSE	RATE	RATE	HOURS	COST	
EMI20	SMALL TOOLS								1.40	1.40	0	1	
											-----	-----	
TOTAL PROJECT EQUIPMENT HOURS												0	1

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6933E6

3-410

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6933

TIME 09:09:32

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	36	1,174
TOTAL PROJECT MANHOURS								36	1,174

* * * END OF SUMMARY REPORT * * *

FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 1 OF 2

BUILDING WIDE FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 6934

BUILDING USE:

HOURS/DAY 12

DAYS/WEEK 5

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$11.78 PER KW

EXISTING FIXTURE DATA

4 FOOT

0 1 LAMP @ 48 W/FIXT = 0 WATTS
 0 1 LAMP @ 37.8 W/FIXT = 0 WATTS
 4 2 LAMP @ 96 W/FIXT = 384 WATTS
 0 2 LAMP @ 75.6 W/FIXT = 0 WATTS
 0 3 LAMP @ 144 W/FIXT = 0 WATTS
 0 3 LAMP @ 113.4 W/FIXT = 0 WATTS
 0 4 LAMP @ 192 W/FIXT = 0 WATTS
 29 4 LAMP @ 151.2 W/FIXT = 4384 WATTS

2 FOOT

0 1 LAMP @ 31 W/FIXT = 0 WATTS
 0 4 LAMP @ 88 W/FIXT = 0 WATTS
 0 2 LAMP U @ 96 W/FIXT = 0 WATTS
 0 2 LAMP U @ 75.6 W/FIXT = 0 WATTS

8 FOOT

0 2 LAMP @ 180 W/FIXT = 0 WATTS
 0 2 LAMP @ 168 W/FIXT = 0 WATTS

TOTAL EXISTING KW 4.77

BASELINE ENERGY CONSUMPTION 50.76 MBTU

REPLACEMENT FIXTURE DATA

4 FOOT

0 1 LAMP @ 37 W/FIXT = 0 WATTS
 4 1 LAMP W/ REFLECTORS 37 W/FIXT = 148 WATTS
 0 2 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS
 29 2 LAMP W/ REFLECTORS 58 W/FIXT = 1682 WATTS

2 FOOT

0 1 LAMP @ 24 W/FIXT = 0 WATTS
 0 2 LAMP W/ REFLECTORS 41 W/FIXT = 0 WATTS
 0 2 LAMP U @ 58 W/FIXT = 0 WATTS

8 FOOT

0 1 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS

TOTAL REPLACEMENT KW 1.83

REPLACEMENT ENERGY CONSUMPTION 19.48 MBTU

NET ENERGY SAVINGS 31.28 MBTU/YR

NET DOLLAR SAVINGS \$609.26

FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 2 OF 2

BUILDING WIDE INCANDESCENT LAMP REPLACEMENT

BUILDING #: 6934

LAMP USE:

HOURS/DAY 5

DAYS/WEEK 5

PEAK USE 2 (1 - YES, 2 - NO)

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$0.00 PER KW

EXISTING INCANDESCENTS

0 LAMPS @ 25 WATTS =	0 WATTS
0 LAMPS @ 40 WATTS =	0 WATTS
3 LAMPS @ 52 WATTS =	156 WATTS
0 LAMPS @ 60 WATTS =	0 WATTS
0 LAMPS @ 75 WATTS =	0 WATTS
0 LAMPS @ 90 WATTS =	0 WATTS
0 LAMPS @ 100 WATTS =	0 WATTS

TOTAL EXISTING WATTS 156

BASELINE ENERGY CONSUMPTION 0.69 MBTU

COMPACT FLUORESCENT REPLACEMENT

0 LAMPS @ 7 WATTS =	0 WATTS
0 LAMPS @ 9 WATTS =	0 WATTS
3 LAMPS @ 13 WATTS =	39 WATTS
0 LAMPS @ 18 WATTS =	0 WATTS
0 LAMPS @ 26 WATTS =	0 WATTS

TOTAL REPLACEMENT WATTS 39

REPLACEMENT ENERGY CONSUMPTION 0.17 MBTU

NET ENERGY SAVINGS 0.51 MBTU/YR

NET DOLLAR SAVINGS \$3.22

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 09:34:54

TITLE PAGE

ENERGY SAVINGS OPPORTUNITY SURVY
FT CAMPBELL, KY
ECO-6: BUILDING 6934

Contract No: 27-93-C-0096

Prepared By: Systems Corp
Estimator: Keith A. Derrington
Estimate Prep. Date: 09/30/93
Current UPB/CSI ID: ORL290

M - C A C E S E D I T I O N
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Release 4.20

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6934E6

3-414

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6934

TIME 09:34:54

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DETAILED ESTIMATE

DETAIL PAGE

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AA. ELECTRICAL.....	1

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Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
 ECO-6: BUILDING 6934
 1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 09:34:54

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL	QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16500 LIGHTING									
16512 6100 SMALL FL FIXTURES (LESS THAN 40 WATT LAMPS)									
CD=3 EL 6105 SURF SQ W/1 13W BIAXIAL FL LAMP *** UNIT COSTS: ***	1.25				41.26	0.00	27.80	1.39	70.45
WC=1100 WHITE ACRYLIC LENS 3.00 EA EELEA	4				124	0	83	4	211
16512 7000 FLUORESCENT - RECESSED T8 ELECTRONIC BALLAST									
CD=3 EL 7002 4 FT 1 LAMP PARABOLIC LOUVRE W/ *** UNIT COSTS: ***	0.54				17.84	0.07	122.00	6.10	146.01
WC=1100 REFLECTOR 4.00 EA EELEB	2				71	0	488	24	584
CD=3 EL 7003 4 FT 2 LAMP PARABOLIC LOUVRE W/ *** UNIT COSTS: ***	0.59				19.42	0.08	136.00	6.80	162.29
WC=1100 REFLECTOR 29.00 EA EELEB	17				563	2	3,944	197	4,707
TOTAL DIVISION 16 ELECTRICAL	23				758	2	4,515	226	5,502
TOTAL FACILITY AA. ELECTRICAL	23				758	2	4,515	226	5,502
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE	23				758	2	4,515	226	5,502
TOTAL BASE BID	23				758	2	4,515	226	5,502
TOTAL ADDITIVE	0				0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY	23				758	2	4,515	226	5,502

*** END OF DETAIL REPORT ***

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6934E6

3-416

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6934

TIME 09:34:54

PROJECT NOTES

SUMMARY PAGE 1

PROJECT NOTES

ECO-6: INTERIOR LIGHTING

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY INTERIOR LIGHTING IN
SELECTED FACILITIES AT FT CAMPBELL.

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6934E6

3-417

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6934

TIME 09:34:54

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY	COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHER FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL	1.00 EA	5,502	10.0% 550	0.0% 0	7.5% 454	2.5% 163	0.0% 0	6,669 6668.67
BID ITEM TOTAL	1.00 EA	5,502	550	0	454	163	0	6,669	6668.67
TOTAL BASE BID		5,502	550	0	454	163	0	6,669	
TOTAL ADDITIVE		0	0	0	0	0	0	0	
TOTAL INCL ADD		5,502	550	0	454	163	0	6,669	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6934E6

3-418

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6934

TIME 09:34:54

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY	UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00	EA	6,669		6,669	6668.70
TOTAL CURRENT CONTRACT COST				6,669	0	6,669	
Cost Growth from 09/93 to 09/94 Index Values: 0000 0000				0.0%	0	0	0
ESCALATED CONTRACT COST				6,669	0	6,669	
Government-Furnished Property				0		0	
SUBTOTAL				6,669	0	6,669	
Contingencies				10.0%	667	0	667
SUBTOTAL				7,336	0	7,336	
SIOH (S&A)				5.5%	403	0	403
CURRENT WORKING ESTIMATE				7,739	0	7,739	

Estimated Construction Time 365 Days

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6934E6

3-419

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6934

TIME 09:34:54

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PM	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT W/TX	AMOUNT	PCT	W/OH&P	SUBTOTAL
AA	GENERAL/PRIME		1.00	EA	23	758	2	4,741	5,502	100.0%	0	5,502
	TOTAL DIRECT				23	758	2	4,741	5,502	100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6934E6

3-420

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6934

TIME 09:34:54

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PM	SUBTOTAL	AMOUNT	PCT	HOFC%	AMOUNT	PCT	BOND%	OTHR%	AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		5,502	550	10.0%	0.0	454	7.5%	2.5%	0.0%	6,669	100.0%	6668.67
	TOTAL OVERHEAD & PROFIT			550	10.0%		454	7.5%					

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6934E6

3-421

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6934

TIME 09:34:54

CSI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	23	758	2	4,515	226	5,502
TOTAL DIRECT	23	758	2	4,515	226	5,502

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6934E6

3-422

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6934

TIME 09:34:54

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	23	758	2	4,515	226	5,502
TOTAL DIRECT	23	758	2	4,515	226	5,502

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6934E6

3-423

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6934

TIME 09:34:54

EQUIPMENT SUMMARY

SUMMARY PAGE 8

EQUIP DESCRIPTION	LIFE HRS	TL HRLY	OWNRSH	OWNRSH	ADJ FACTOR	ADJUSTD	BOOK OP	HRLY	UPB	**** TOTAL ****	COST
EMI20 SMALL TOOLS								1.40	1.40	2	2
TOTAL PROJECT EQUIPMENT HOURS										2	2

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6934E6

3-424

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6934

TIME 09:34:54

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	23	758
TOTAL PROJECT MANHOURS								23	758

* * * END OF SUMMARY REPORT * * *

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6934E6

3-425

FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 1 OF 3

BUILDING WIDE FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 6935

BUILDING USE: 12

HOURS/DAY 5

DAYS/WEEK

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$11.78 PER KW

EXISTING FIXTURE DATA

4 FOOT

0 1 LAMP @ 48 W/FIXT = 0 WATTS

0 1 LAMP @ 37.8 W/FIXT = 0 WATTS

0 2 LAMP @ 96 W/FIXT = 0 WATTS

0 2 LAMP @ 75.6 W/FIXT = 0 WATTS

0 3 LAMP @ 144 W/FIXT = 0 WATTS

0 3 LAMP @ 113.4 W/FIXT = 0 WATTS

12 4 LAMP @ 192 W/FIXT = 2304 WATTS

8 4 LAMP @ 151.2 W/FIXT = 1209 WATTS

2 FOOT

0 1 LAMP @ 31 W/FIXT = 0 WATTS

0 4 LAMP @ 88 W/FIXT = 0 WATTS

0 2 LAMP U @ 96 W/FIXT = 0 WATTS

0 2 LAMP U @ 75.6 W/FIXT = 0 WATTS

8 FOOT

0 2 LAMP @ 180 W/FIXT = 0 WATTS

0 2 LAMP @ 168 W/FIXT = 0 WATTS

REPLACEMENT FIXTURE DATA

4 FOOT

0 1 LAMP @ 37 W/FIXT = 0 WATTS

0 1 LAMP W/ REFLECTORS 37 W/FIXT = 0 WATTS

0 2 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS

20 2 LAMP W/ REFLECTORS 58 W/FIXT = 1160 WATTS

2 FOOT

0 1 LAMP @ 24 W/FIXT = 0 WATTS

0 2 LAMP W/ REFLECTORS 41 W/FIXT = 0 WATTS

0 2 LAMP U @ 58 W/FIXT = 0 WATTS

8 FOOT

0 1 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS

TOTAL EXISTING KW 3.51

BASELINE ENERGY CONSUMPTION 37.40 MBTU

TOTAL REPLACEMENT KW 1.16

REPLACEMENT ENERGY CONSUMPTION 12.35 MBTU

NET ENERGY SAVINGS 25.06 MBTU/YR

NET DOLLAR SAVINGS \$487.94

FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 2 OF 3

OVERLIT AREA FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 6935
AREA: OFFICES

AREA USE:
HOURS/DAY 12
DAYS/WEEK 5

ELECTRIC COSTS:
ENERGY CHARGE \$0.0211 PER KWH
DEMAND CHARGE \$11.78 PER KW

EXISTING FIXTURE DATA

4 FOOT
1 LAMP @ 48 W/FIXT = 0 WATTS
1 LAMP @ 37.8 W/FIXT = 0 WATTS
2 LAMP @ 96 W/FIXT = 0 WATTS
2 LAMP @ 75.6 W/FIXT = 0 WATTS
3 LAMP @ 144 W/FIXT = 0 WATTS
3 LAMP @ 119.4 W/FIXT = 0 WATTS
4 LAMP @ 192 W/FIXT = 0 WATTS
15.4 LAMP @ 151.2 W/FIXT = 2268 WATTS

2 FOOT
1 LAMP @ 31 W/FIXT = 0 WATTS
4 LAMP @ 88 W/FIXT = 0 WATTS
2 LAMP U @ 96 W/FIXT = 0 WATTS
2 LAMP U @ 75.6 W/FIXT = 0 WATTS

8 FOOT
2 LAMP @ 180 W/FIXT = 0 WATTS
2 LAMP @ 168 W/FIXT = 0 WATTS

REPLACEMENT FIXTURE DATA

4 FOOT
0.1 LAMP @ 37 W/FIXT = 0 WATTS
0.1 LAMP @ 37 W/FIXT = 0 WATTS
0.2 LAMP @ 58 W/FIXT = 0 WATTS
15.2 LAMP @ 58 W/FIXT = 870 WATTS

2 FOOT
0.1 LAMP @ 24 W/FIXT = 0 WATTS
0.2 LAMP @ 41 W/FIXT = 0 WATTS
0.2 LAMP U @ 58 W/FIXT = 0 WATTS

8 FOOT
0.1 LAMP @ 58 W/FIXT = 0 WATTS

TOTAL EXISTING KW 2.268
BASELINE ENERGY CONSUMPTION 24.14 MBTU
TOTAL REPLACEMENT KW 0.87
REPLACEMENT ENERGY CONSUMPTION 9.26 MBTU

NET ENERGY SAVINGS 14.8 MBTU/YR
NET DOLLAR SAVINGS \$289.83

FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 3 OF 3

BUILDING WIDE INCANDESCENT LAMP REPLACEMENT

BUILDING #: 6935

LAMP USE:

HOURS/DAY 5

DAYS/WEEK 5

PEAK USE 2 (1-YES, 2-NO)

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$0.00 PER KW

EXISTING INCANDESCENTS

0 LAMPS @ 25 WATTS =	0 WATTS
0 LAMPS @ 40 WATTS =	0 WATTS
1 LAMPS @ 52 WATTS =	52 WATTS
0 LAMPS @ 60 WATTS =	0 WATTS
0 LAMPS @ 75 WATTS =	0 WATTS
0 LAMPS @ 90 WATTS =	0 WATTS
0 LAMPS @ 100 WATTS =	0 WATTS
TOTAL EXISTING WATTS	52

COMPACT FLUORESCENT REPLACEMENT

0 LAMPS @ 7 WATTS =	0 WATTS
0 LAMPS @ 9 WATTS =	0 WATTS
1 LAMPS @ 13 WATTS =	13 WATTS
0 LAMPS @ 18 WATTS =	0 WATTS
0 LAMPS @ 26 WATTS =	0 WATTS
TOTAL REPLACEMENT WATTS	13

TOTAL EXISTING WATTS 52

TOTAL REPLACEMENT WATTS 13

BASELINE ENERGY CONSUMPTION 0.23 MBTU

REPLACEMENT ENERGY CONSUMPTION 0.06 MBTU

NET ENERGY SAVINGS 0.17 MBTU/YR

NET DOLLAR SAVINGS \$1.07

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 09:41:40

TITLE PAGE

ENERGY SAVINGS OPPORTUNITY SURVY
FT CAMPBELL, KY
ECO-6: BUILDING 6935

Contract No: 27-93-C-0096

Prepared By: Systems Corp
Estimator: Keith A. Derrington
Estimate Prep. Date: 09/30/93
Current UPB/CSI ID: ORL290

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CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6935E6

3-429

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6935

TIME 09:41:40

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Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
 ECO-6: BUILDING 6935
 1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 09:41:40

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL		QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16500 LIGHTING										
16512 6100 SMALL FL FIXTURES (LESS THAN 40 WATT LAMPS)										
CD=3 EL 6105	SURF SQ W/1 13W BIAXIAL FL LAMP	*** UNIT COSTS: ***			1.25	41.26	0.00	27.80	1.39	70.45
WC=1100	WHITE ACRYLIC LENS	1.00 EA EELEA		1	41	0	28	1		70
16512 7000 FLUORESCENT - RECESSED T8 ELECTRONIC BALLAST										
CD=3 EL 7003	4 FT 2 LAMP PARABOLIC LOUVRE W/	*** UNIT COSTS: ***			0.59	19.42	0.08	136.00	6.80	162.29
WC=1100	REFLECTOR	20.00 EA EELEB		12	388	2	2,720	136		3,246
CD=3 EL 7008	4 FT 2 LAMP PARABOLIC LOUVRE	*** UNIT COSTS: ***			0.50	16.51	0.06	120.00	6.00	142.57
WC=1100		15.00 EA EELEB		8	248	1	1,800	90		2,139
TOTAL DIVISION 16 ELECTRICAL					21	677	2	4,548	227	5,455
TOTAL FACILITY AA. ELECTRICAL					21	677	2	4,548	227	5,455
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE					21	677	2	4,548	227	5,455
TOTAL BASE BID					21	677	2	4,548	227	5,455
TOTAL ADDITIVE					0	0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY					21	677	2	4,548	227	5,455

*** END OF DETAIL REPORT ***

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6935E6
 3-431

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6935

TIME 09:41:40

PROJECT NOTES

SUMMARY PAGE 1

PROJECT NOTES

ECO-6: INTERIOR LIGHTING

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY INTERIOR LIGHTING IN
SELECTED FACILITIES AT FT CAMPBELL.

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6935E6
3-432

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6935

TIME 09:41:40

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY	COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHR FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL	1.00 EA	5,455	10.0% 545	0.0% 0	7.5% 450	2.5% 161	0.0% 0	6,612 6611.63
BID ITEM TOTAL	1.00 EA	5,455	545	0	450	161	0	6,612	6611.63
TOTAL BASE BID		5,455	545	0	450	161	0	6,612	
TOTAL ADDITIVE		0	0	0	0	0	0	0	
TOTAL INCL ADD		5,455	545	0	450	161	0	6,612	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6935E6

3-433

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
 ECO-6: BUILDING 6935

TIME 09:41:40

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID BID ITEM	QUANTITY UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1. BUILDING TO THE 5 FOOT LINE	1.00 EA	6,612		6,612	6611.60
TOTAL CURRENT CONTRACT COST		6,612	0	6,612	
Cost Growth from 09/93 to 09/94 Index Values: 0000 0000	0.0%	0	0	0	
ESCALATED CONTRACT COST		6,612	0	6,612	
Government-Furnished Property		0		0	
SUBTOTAL		6,612	0	6,612	
Contingencies	10.0%	661	0	661	
SUBTOTAL		7,273	0	7,273	
SIOH (S&A)	5.5%	400	0	400	
CURRENT WORKING ESTIMATE		7,673	0	7,673	

Estimated Construction Time 365 Days

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6935E6

3-434

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6935

TIME 09:41:40

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PM	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT W/TX	AMOUNT	PCT	W/OH&P	SUBTOTAL
AA	GENERAL/PRIME		1.00	EA	21	677	2	4,775	5,455	100.0%	0	5,455
	TOTAL DIRECT				21	677	2	4,775	5,455	100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6935E6
3-435

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6935

TIME 09:41:40

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PM	SUBTOTAL	*** OVERHEAD ***	AMOUNT	PCT	HOFC%	**** PROFIT ****	AMOUNT	PCT	BOND%	OTHR%	***** TOTAL CONTRACT *****	AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		5,455		545	10.0%	0.0		450	7.5%	2.5%	0.0%		6,612	100.0%	6611.64
	TOTAL OVERHEAD & PROFIT				545	10.0%			450	7.5%						

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6935E6

3-436

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6935

TIME 09:41:40

CSI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	21	677	2	4,548	227	5,455
TOTAL DIRECT	21	677	2	4,548	227	5,455

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6935E6

3-437

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6935

TIME 09:41:40

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	21	677	2	4,548	227	5,455
TOTAL DIRECT	21	677	2	4,548	227	5,455

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6935E6

3-438

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6935

TIME 09:41:40

EQUIPMENT SUMMARY

SUMMARY PAGE 8

EQUIP DESCRIPTION	LIFE HRS	TL	HRLY	OWNRSH	OWNS	OVTM	OWNRSH	EXPENSE	RATE	UPB	HOURS	TOTAL	COST
EMI20 SMALL TOOLS									1.40	1.40	2	2	
TOTAL PROJECT EQUIPMENT HOURS											2	2	

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6935

TIME 09:41:40

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	21	678
TOTAL PROJECT MANHOURS								21	678

*** END OF SUMMARY REPORT ***

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6935E6

3-440

FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 1 OF 1

BUILDING WIDE FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 6991

BUILDING USE:

HOURS/DAY 9

DAYS/WEEK 5

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$11.78 PER KW

EXISTING FIXTURE DATA

4 FOOT

5 1 LAMP @ 48 W/FIXT = 240 WATTS
 0 1 LAMP @ 37.8 W/FIXT = 0 WATTS
 1 2 LAMP @ 96 W/FIXT = 96 WATTS
 0 2 LAMP @ 75.6 W/FIXT = 0 WATTS
 0 3 LAMP @ 144 W/FIXT = 0 WATTS
 0 3 LAMP @ 113.4 W/FIXT = 0 WATTS
 26 4 LAMP @ 192 W/FIXT = 4992 WATTS
 0 4 LAMP @ 151.2 W/FIXT = 0 WATTS

2 FOOT

0 1 LAMP @ 31 W/FIXT = 0 WATTS
 0 4 LAMP @ 88 W/FIXT = 0 WATTS
 0 2 LAMP U @ 96 W/FIXT = 0 WATTS
 0 2 LAMP U @ 75.6 W/FIXT = 0 WATTS

8 FOOT

0 2 LAMP @ 180 W/FIXT = 0 WATTS
 0 2 LAMP @ 168 W/FIXT = 0 WATTS

TOTAL EXISTING KW 5.33

BASELINE ENERGY CONSUMPTION 42.53 MBTU

REPLACEMENT FIXTURE DATA

4 FOOT

5 1 LAMP @ 37 W/FIXT = 185 WATTS
 1 1 LAMP W/ REFLECTORS 37 W/FIXT = 37 WATTS
 0 2 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS
 26 2 LAMP W/ REFLECTORS 58 W/FIXT = 1508 WATTS

2 FOOT

0 1 LAMP @ 24 W/FIXT = 0 WATTS
 0 2 LAMP W/ REFLECTORS 41 W/FIXT = 0 WATTS
 0 2 LAMP U @ 58 W/FIXT = 0 WATTS

8 FOOT

0 1 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS

TOTAL REPLACEMENT KW 1.73

REPLACEMENT ENERGY CONSUMPTION 13.81 MBTU

NET ENERGY SAVINGS 28.73 MBTU/YR

NET DOLLAR SAVINGS \$686.60

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 10:01:03

TITLE PAGE

ENERGY SAVINGS OPPORTUNITY SURVY
FT CAMPBELL, KY
ECO-6: BUILDING 6991

Contract No: 27-93-C-0096

Prepared By: Systems Corp
Estimator: Keith A. Derrington
Estimate Prep. Date: 09/30/93
Current UPB/CSI ID: ORL290

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CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6991E6
3-442

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6991

TIME 10:01:03

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DETAILED ESTIMATE

DETAIL PAGE

1. BUILDING TO THE 5 FOOT LINE	
AA. ELECTRICAL.....	1

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Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
 ECO-6: BUILDING 6991
 1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 10:01:03

TAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL			QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16500 LIGHTING											
16512 7000 FLUORESCENT - RECESSED T8 ELECTRONIC BALLAST											
CD=3 EL 7001	4 FT 1 LAMP PARABOLIC LOUVRE	*** UNIT COSTS: ***	0.57			18.86	0.07	105.25	5.26	129.45	
WC=1100		5.00 EA EELEB	3			94	0	526	26	647	
CD=3 EL 7002	4 FT 1 LAMP PARABOLIC LOUVRE W/ REFLECTOR	*** UNIT COSTS: ***	0.54			17.84	0.07	122.00	6.10	146.01	
WC=1100		1.00 EA EELEB	1			18	0	122	6	146	
CD=3 EL 7003	4 FT 2 LAMP PARABOLIC LOUVRE W/ REFLECTOR	*** UNIT COSTS: ***	0.59			19.42	0.08	136.00	6.80	162.29	
WC=1100		26.00 EA EELEB	15			505	2	3,536	177	4,220	
TOTAL DIVISION 16 ELECTRICAL						19	617	2	4,184	209	5,013
TOTAL FACILITY AA. ELECTRICAL						19	617	2	4,184	209	5,013
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE						19	617	2	4,184	209	5,013
TOTAL BASE BID						19	617	2	4,184	209	5,013
TOTAL ADDITIVE						0	0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY						19	617	2	4,184	209	5,013

* * * END OF DETAIL REPORT * * *

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6991E6

3-444

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6991

TIME 10:01:03

PROJECT NOTES

SUMMARY PAGE 1

PROJECT NOTES

ECO-6: INTERIOR LIGHTING

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY INTERIOR LIGHTING IN
SELECTED FACILITIES AT FT CAMPBELL.

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6991E6

3-445

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
 ECO-6: BUILDING 6991

TIME 10:01:03

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY		COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHR FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL	1.00 EA	5,013	10.0% 501	0.0% 0	7.5% 414	2.5% 148	0.0% 0	6,076	6075.94
BID ITEM TOTAL		1.00 EA	5,013	501	0	414	148	0	6,076	6075.94
TOTAL BASE BID			5,013	501	0	414	148	0	6,076	
TOTAL ADDITIVE			0	0	0	0	0	0	0	
TOTAL INCL ADD			5,013	501	0	414	148	0	6,076	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6991E6

3-446

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6991

TIME 10:01:03

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY	UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00	EA	6,076		6,076	6075.90
TOTAL CURRENT CONTRACT COST				6,076	0	6,076	
Cost Growth from 09/93 to 09/94 Index Values: 0000 0000		0.0%		0	0	0	
ESCALATED CONTRACT COST				6,076	0	6,076	
Government-Furnished Property				0		0	
SUBTOTAL				6,076	0	6,076	
Contingencies		10.0%		608	0	608	
SUBTOTAL				6,683	0	6,683	
SIOH (S&A)		5.5%		368	0	368	
CURRENT WORKING ESTIMATE				7,051	0	7,051	

Estimated Construction Time 365 Days

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6991E6
3-447

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6991

TIME 10:01:03

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PM	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT W/TX	AMOUNT	PCT	W/OH&P	SUBTOTAL
AA	GENERAL/PRIME		1.00	EA	19	617	2	4,393	5,013	100.0%	0	5,013
	TOTAL DIRECT				19	617	2	4,393	5,013	100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6991E6

3-448

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6991

TIME 10:01:03

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PM	SUBTOTAL	*** OVERHEAD ***	AMOUNT	PCT	HOFC%	**** PROFIT ****	AMOUNT	PCT	BOND%	OTHER%	***** TOTAL CONTRACT *****	AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		5,013	501	10.0%	0.0		414	7.5%	2.5%	0.0%		6,076	100.0%		6075.94
	TOTAL OVERHEAD & PROFIT			501	10.0%			414	7.5%							

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6991E6

3-449

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6991

TIME 10:01:03

CSI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	19	617	2	4,184	209	5,013
TOTAL DIRECT	19	617	2	4,184	209	5,013

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6991E6

3-450

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6991

TIME 10:01:03

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	19	617	2	4,184	209	5,013
TOTAL DIRECT	19	617	2	4,184	209	5,013

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6991E6

3-451

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6991

TIME 10:01:03

EQUIPMENT SUMMARY

SUMMARY PAGE 8

EQUIP DESCRIPTION	LIFE HRS	TL HRLY	OWNRSH	OWNS	OVTM	OWNRSH	EXPENSE	HRLY RATE	UPB RATE	HOURS	TOTAL COST
EMI20 SMALL TOOLS								1.40	1.40	2	2
TOTAL PROJECT EQUIPMENT HOURS										2	2

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6991

TIME 10:01:03

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	19	617
TOTAL PROJECT MANHOURS								19	617

* * * END OF SUMMARY REPORT * * *

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6991E6
3-453

FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

PAGE 1 OF 1

30 SEPTEMBER 1993

BUILDING WIDE FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 6993

BUILDING USE:

HOURS/DAY 12

DAYS/WEEK 5

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$11.78 PER KW

EXISTING FIXTURE DATA

4 FOOT

0 1 LAMP @ 48 W/FIXT = 0 WATTS
 0 1 LAMP @ 37.8 W/FIXT = 0 WATTS
 21 2 LAMP @ 96 W/FIXT = 2016 WATTS
 0 2 LAMP @ 75.6 W/FIXT = 0 WATTS
 0 3 LAMP @ 144 W/FIXT = 0 WATTS
 0 3 LAMP @ 113.4 W/FIXT = 0 WATTS
 6 4 LAMP @ 192 W/FIXT = 1152 WATTS
 0 4 LAMP @ 151.2 W/FIXT = 0 WATTS

2 FOOT

0 1 LAMP @ 31 W/FIXT = 0 WATTS
 0 4 LAMP @ 86 W/FIXT = 0 WATTS
 0 2 LAMP U @ 96 W/FIXT = 0 WATTS
 0 2 LAMP U @ 75.6 W/FIXT = 0 WATTS

8 FOOT

0 2 LAMP @ 180 W/FIXT = 0 WATTS
 0 2 LAMP @ 168 W/FIXT = 0 WATTS

TOTAL EXISTING KW 3.17

BASELINE ENERGY CONSUMPTION 33.72 MBTU

REPLACEMENT FIXTURE DATA

4 FOOT

0 1 LAMP @ 37 W/FIXT = 0 WATTS
 21 1 LAMP W/ REFLECTORS 37 W/FIXT = 777 WATTS
 0 2 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS
 6 2 LAMP W/ REFLECTORS 58 W/FIXT = 348 WATTS

2 FOOT

0 1 LAMP @ 24 W/FIXT = 0 WATTS
 0 2 LAMP W/ REFLECTORS 41 W/FIXT = 0 WATTS
 0 2 LAMP U @ 58 W/FIXT = 0 WATTS

8 FOOT

0 1 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS

TOTAL REPLACEMENT KW 1.13

REPLACEMENT ENERGY CONSUMPTION 11.98 MBTU

NET ENERGY SAVINGS 21.75 MBTU/YR

NET DOLLAR SAVINGS \$423.55

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 10:08:38

TITLE PAGE

ENERGY SAVINGS OPPORTUNITY SURVY
FT CAMPBELL, KY
ECO-6: BUILDING 6993

Contract No: 27-93-C-0096

Prepared By: Systems Corp
Estimator: Keith A. Derrington
Estimate Prep. Date: 09/30/93
Current UPB/CSI ID: ORL290

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CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6993E6

3-455

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6993

TIME 10:08:38

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DETAILED ESTIMATE

DETAIL PAGE

1. BUILDING TO THE 5 FOOT LINE	
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Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
 ECO-6: BUILDING 6993
 1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 10:08:38

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL		QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16500 LIGHTING										
16512 7000 FLUORESCENT - RECESSED T8 ELECTRONIC BALLAST										
CD=3 EL 7002	4 FT 1 LAMP PARABOLIC LOUVRE W/	*** UNIT COSTS: ***			0.54	17.84	0.07	122.00	6.10	146.01
WC=1100	REFLECTOR	21.00 EA EELEB		11	375		1	2,562	128	3,066
CD=3 EL 7003	4 FT 2 LAMP PARABOLIC LOUVRE W/	*** UNIT COSTS: ***			0.59	19.42	0.08	136.00	6.80	162.29
WC=1100	REFLECTOR	6.00 EA EELEB		4	117		0	816	41	974
TOTAL DIVISION 16 ELECTRICAL					15	491	2	3,378	169	4,040
TOTAL FACILITY AA. ELECTRICAL					15	491	2	3,378	169	4,040
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE					15	491	2	3,378	169	4,040
TOTAL BASE BID					15	491	2	3,378	169	4,040
TOTAL ADDITIVE					0	0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY					15	491	2	3,378	169	4,040

*** END OF DETAIL REPORT ***

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6993E6

3-457

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6993

TIME 10:08:38

PROJECT NOTES

SUMMARY PAGE 1

PROJECT NOTES

ECO-6: INTERIOR LIGHTING

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY INTERIOR LIGHTING IN
SELECTED FACILITIES AT FT CAMPBELL.

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6993E6
3-458

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
 ECO-6: BUILDING 6993

TIME 10:08:38

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY	COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHR FCTR	TOTAL COST	UNIT COST	
AA	ELECTRICAL	1.00 EA	4,040	10.0% 404	0.0% 0	7.5% 333	2.5% 119	0.0% 0	4,897	4896.77
BID ITEM TOTAL		1.00 EA	4,040	404	0	333	119	0	4,897	4896.77
TOTAL BASE BID			4,040	404	0	333	119	0	4,897	
TOTAL ADDITIVE			0	0	0	0	0	0	0	
TOTAL INCL ADD			4,040	404	0	333	119	0	4,897	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6993E6

3-459

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6993

TIME 10:08:38

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY	UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00	EA	4,897		4,897	4896.80
	TOTAL CURRENT CONTRACT COST			4,897	0	4,897	
	Cost Growth from 09/93 to 09/94 Index Values: 0000 0000	0.0%		0	0	0	
	ESCALATED CONTRACT COST			4,897	0	4,897	
	Government-Furnished Property			0		0	
	SUBTOTAL			4,897	0	4,897	
	Contingencies	10.0%		490	0	490	
	SUBTOTAL			5,386	0	5,386	
	SIOH (S&A)	5.5%		296	0	296	
	CURRENT WORKING ESTIMATE			5,683	0	5,683	
	Estimated Construction Time	365	Days				

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6993E6

3-460

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6993

TIME 10:08:38

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PH	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT	W/TX	** TOTAL DIRECT *	** SUBCON *	W/OH&P	SUBTOTAL
										AMOUNT	PCT		
AA	GENERAL/PRIME		1.00	EA	15	491	2	3,547		4,040	100.0%	0	4,040
	TOTAL DIRECT				15	491	2	3,547		4,040	100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6993E6

3-461

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6993

TIME 10:08:38

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PM	SUBTOTAL	*** OVERHEAD *** AMOUNT	PCT	HOFC%	**** PROFIT **** AMOUNT	PCT	BOND% OTHER%	***** TOTAL CONTRACT ***** AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		4,040	404	10.0%	0.0	333	7.5%	2.5% 0.0%	4,897	100.0%	4896.77
	TOTAL OVERHEAD & PROFIT			404	10.0%		333	7.5%				

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6993E6

3-462

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6993

TIME 10:08:38

SI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	15	491	2	3,378	169	4,040
TOTAL DIRECT	15	491	2	3,378	169	4,040

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6993E6

3-463

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6993

TIME 10:08:38

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	15	491	2	3,378	169	4,040
TOTAL DIRECT	15	491	2	3,378	169	4,040

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6993E6

3-464

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6993

TIME 10:08:38

EQUIPMENT SUMMARY

SUMMARY PAGE 8

----- *** BOOK VALUE *** ADJ FACTOR ADJUSTD BOOK OP -- HRLY --- UPB **** TOTAL ****											
EQUIP DESCRIPTION	LIFE HRS	TL HRLY	OWNRSH	OWNS	OVTM	OWNRSH	EXPENSE	RATE	RATE	HOURS	COST
EMI20 SMALL TOOLS								1.40	1.40	1	2
TOTAL PROJECT EQUIPMENT HOURS										1	2

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6993E6

3-465

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6993

TIME 10:08:38

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTH	TKS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	15	491
TOTAL PROJECT MANHOURS								15	491

*** END OF SUMMARY REPORT ***

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6993E6

3-466

FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 1 OF 1

BUILDING WIDE FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 6995

BUILDING USE:

HOURS/DAY 12

DAYS/WEEK 5

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$11.78 PER KW

EXISTING FIXTURE DATA

4 FOOT

3 1 LAMP @ 48 W/FIXT = 144 WATTS
 0 1 LAMP @ 37.8 W/FIXT = 0 WATTS
 4 2 LAMP @ 96 W/FIXT = 384 WATTS
 0 2 LAMP @ 75.6 W/FIXT = 0 WATTS
 0 3 LAMP @ 144 W/FIXT = 0 WATTS
 0 3 LAMP @ 113.4 W/FIXT = 0 WATTS
 26 4 LAMP @ 192 W/FIXT = 4992 WATTS
 0 4 LAMP @ 151.2 W/FIXT = 0 WATTS

2 FOOT

0 1 LAMP @ 31 W/FIXT = 0 WATTS
 0 4 LAMP @ 88 W/FIXT = 0 WATTS
 0 2 LAMP U @ 96 W/FIXT = 0 WATTS
 0 2 LAMP U @ 75.6 W/FIXT = 0 WATTS

8 FOOT

0 2 LAMP @ 180 W/FIXT = 0 WATTS
 0 2 LAMP @ 168 W/FIXT = 0 WATTS

REPLACEMENT FIXTURE DATA

4 FOOT

3 1 LAMP @ 37 W/FIXT = 111 WATTS
 4 1 LAMP W/ REFLECTORS 37 W/FIXT = 148 WATTS
 0 2 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS
 26 2 LAMP W/ REFLECTORS 58 W/FIXT = 1508 WATTS

2 FOOT

0 1 LAMP @ 24 W/FIXT = 0 WATTS
 0 2 LAMP W/ REFLECTORS 41 W/FIXT = 0 WATTS
 0 2 LAMP U @ 58 W/FIXT = 0 WATTS

8 FOOT

0 1 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS

TOTAL EXISTING KW 5.52

TOTAL REPLACEMENT KW 1.77

BASELINE ENERGY CONSUMPTION 58.76 MBTU

REPLACEMENT ENERGY CONSUMPTION 18.81 MBTU

NET ENERGY SAVINGS 39.95 MBTU/YR

NET DOLLAR SAVINGS \$778.06

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 10:23:42

TITLE PAGE

ENERGY SAVINGS OPPORTUNITY SURVY
FT CAMPBELL, KY
ECO-6: BUILDING 6995

Contract No: 27-93-C-0096

Prepared By: Systems Corp
Estimator: Keith A. Derrington
Estimate Prep. Date: 09/30/93

Current UPB/CSI ID: ORL290

M - C A C E S E D I T I O N
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CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6995E6

3-468

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6995

TIME 10:23:42

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DETAILED ESTIMATE

DETAIL PAGE

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Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
 ECO-6: BUILDING 6995
 1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 10:23:42

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL		QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$

16500 LIGHTING										
16512 7000 FLUORESCENT - RECESSED T8 ELECTRONIC BALLAST										
CD=3 EL 7001	4 FT 1 LAMP PARABOLIC LOUVRE	*** UNIT COSTS: ***			0.57	18.86	0.07	105.25	5.26	129.45
WC=1100		3.00 EA EELEB		2	57	0	0	316	16	388
CD=3 EL 7002	4 FT 1 LAMP PARABOLIC LOUVRE W/	*** UNIT COSTS: ***			0.54	17.84	0.07	122.00	6.10	146.01
WC=1100	REFLECTOR	4.00 EA EELEB		2	71	0	0	488	24	584
CD=3 EL 7003	4 FT 2 LAMP PARABOLIC LOUVRE W/	*** UNIT COSTS: ***			0.59	19.42	0.08	136.00	6.80	162.29
WC=1100	REFLECTOR	26.00 EA EELEB		15	505	2	2	3,536	177	4,220
TOTAL DIVISION 16 ELECTRICAL					19	633	2	4,340	217	5,192
TOTAL FACILITY AA. ELECTRICAL					19	633	2	4,340	217	5,192
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE					19	633	2	4,340	217	5,192
TOTAL BASE BID					19	633	2	4,340	217	5,192
TOTAL ADDITIVE					0	0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY					19	633	2	4,340	217	5,192

*** END OF DETAIL REPORT ***

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6995E6

3-470

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6995

TIME 10:23:42

PROJECT NOTES

SUMMARY PAGE 1

PROJECT NOTES

ECO-6: INTERIOR LIGHTING

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY INTERIOR LIGHTING IN
SELECTED FACILITIES AT FT CAMPBELL.

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6995E6

3-471

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6995

TIME 10:23:42

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY		COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHR FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL	1.00 EA	5,192	10.0% 519	0.0% 0	7.5% 428	2.5% 153	0.0% 0	6,293	6293.06
<hr/>										
BID ITEM TOTAL		1.00 EA	5,192	519	0	428	153	0	6,293	6293.06
<hr/>										
TOTAL BASE BID			5,192	519	0	428	153	0	6,293	
TOTAL ADDITIVE			0	0	0	0	0	0	0	
<hr/>										
TOTAL INCL ADD			5,192	519	0	428	153	0	6,293	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6995E6

3-472

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6995

TIME 10:23:42

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY	UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00	EA	6,293		6,293	6293.10
TOTAL CURRENT CONTRACT COST				6,293	0	6,293	
Cost Growth from 09/93 to 09/94 Index Values: 0000 0000		0.0%		0	0	0	
ESCALATED CONTRACT COST				6,293	0	6,293	
Government-Furnished Property				0		0	
SUBTOTAL				6,293	0	6,293	
Contingencies		10.0%		629	0	629	
SUBTOTAL				6,922	0	6,922	
SIOH (S&A)		5.5%		381	0	381	
CURRENT WORKING ESTIMATE				7,303	0	7,303	

Estimated Construction Time 365 Days

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6995E6

3-473

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6995

TIME 10:23:42

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PM	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT	W/TX	AMOUNT	PCT	W/OH&P	SUBTOTAL
AA	GENERAL/PRINE		1.00	EA	19	633	2	4,557		5,192	100.0%	0	5,192
	TOTAL DIRECT				19	633	2	4,557		5,192	100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6995E6
3-474

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6995

TIME 10:23:42

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PH	SUBTOTAL	*** OVERHEAD ***	AMOUNT	PCT	HOFC%	**** PROFIT ****	AMOUNT	PCT	BOND%	OTHR%	***** TOTAL CONTRACT *****	AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		5,192	519	10.0%	0.0		428	7.5%	2.5%	0.0%		6,293	100.0%		6293.07
	TOTAL OVERHEAD & PROFIT			519	10.0%			428	7.5%							

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6995E6

3-475

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6995

TIME 10:23:42

SI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	19	633	2	4,340	217	5,192
TOTAL DIRECT	19	633	2	4,340	217	5,192

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6995E6

3-476

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6995

TIME 10:23:42

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	19	633	2	4,340	217	5,192
TOTAL DIRECT	19	633	2	4,340	217	5,192

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6995E6

3-477

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6995

TIME 10:23:42

EQUIPMENT SUMMARY

SUMMARY PAGE 8

EQUIP	DESCRIPTION	LIFE HRS	TL	HRLY	OWNRSH	OWNS	OVTM	OWNRSH	EXPENSE	HRLY	UPB	*****	TOTAL	*****
										RATE	RATE	HOURS		COST
EMI20	SMALL TOOLS									1.40	1.40	2		2
													2	2
TOTAL PROJECT EQUIPMENT HOURS														

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6995E6

3-478

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6995

TIME 10:23:42

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	19	633
TOTAL PROJECT MANHOURS								19	633

* * * END OF SUMMARY REPORT * * *

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6995E6

3-479

FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

PAGE 1 OF 1

30 SEPTEMBER 1993

BUILDING WIDE FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 6997

BUILDING USE:

HOURS/DAY 14

DAYS/WEEK 5

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$11.78 PER KW

EXISTING FIXTURE DATA

4 FOOT
 3 1 LAMP @ 48 W/FIXT = 144 WATTS
 0 1 LAMP @ 37.8 W/FIXT = 0 WATTS
 5 2 LAMP @ 96 W/FIXT = 480 WATTS
 0 2 LAMP @ 75.6 W/FIXT = 0 WATTS
 0 3 LAMP @ 144 W/FIXT = 0 WATTS
 0 3 LAMP @ 113.4 W/FIXT = 0 WATTS
 53 4 LAMP @ 192 W/FIXT = 10176 WATTS
 0 4 LAMP @ 151.2 W/FIXT = 0 WATTS

2 FOOT
 0 1 LAMP @ 31 W/FIXT = 0 WATTS
 0 4 LAMP @ 88 W/FIXT = 0 WATTS
 0 2 LAMP U @ 96 W/FIXT = 0 WATTS
 0 2 LAMP U @ 75.6 W/FIXT = 0 WATTS

8 FOOT
 0 2 LAMP @ 180 W/FIXT = 0 WATTS
 0 2 LAMP @ 168 W/FIXT = 0 WATTS

TOTAL EXISTING KW 10.80

BASELINE ENERGY CONSUMPTION 134.1 MBTU

NET ENERGY SAVINGS 92.28 MBTU/YR

REPLACEMENT FIXTURE DATA

4 FOOT
 3 1 LAMP @ 37 W/FIXT = 111 WATTS
 5 1 LAMP W/ REFLECTORS 37 W/FIXT = 185 WATTS
 0 2 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS
 53 2 LAMP W/ REFLECTORS 58 W/FIXT = 3074 WATTS

2 FOOT
 0 1 LAMP @ 24 W/FIXT = 0 WATTS
 0 2 LAMP W/ REFLECTORS 41 W/FIXT = 0 WATTS
 0 2 LAMP U @ 58 W/FIXT = 0 WATTS

8 FOOT
 0 1 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS

TOTAL REPLACEMENT KW 3.37

REPLACEMENT ENERGY CONSUMPTION 41.85 MBTU

NET DOLLAR SAVINGS \$1,622.04

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 10:30:44

TITLE PAGE

ENERGY SAVINGS OPPORTUNITY SURVY
FT CAMPBELL, KY
ECO-6: BUILDING 6997

Contract No: 27-93-C-0096

Prepared By: Systems Corp
Estimator: Keith A. Derrington
Estimate Prep. Date: 09/30/93
Current UPB/CSI ID: ORL290

M - C A C E S E D I T I O N
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CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6997E6
3-481

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6997

TIME 10:30:44

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DETAILED ESTIMATE	DETAIL PAGE
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Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
 ECO-6: BUILDING 6997
 1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 10:30:44

TAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL				QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$

16500 LIGHTING												
16512 7000 FLUORESCENT - RECESSED T8 ELECTRONIC BALLAST												
CD=3 EL 7001	4 FT 1 LAMP PARABOLIC LOUVRE	*** UNIT COSTS: ***	0.57	18.86	0.07	105.25	5.26	129.45				
WC=1100		3.00 EA EELEB	2	57	0	316	16	388				
CD=3 EL 7002	4 FT 1 LAMP PARABOLIC LOUVRE W/ REFLECTOR	*** UNIT COSTS: ***	0.54	17.84	0.07	122.00	6.10	146.01				
WC=1100		5.00 EA EELEB	3	89	0	610	31	730				
CD=3 EL 7003	4 FT 2 LAMP PARABOLIC LOUVRE W/ REFLECTOR	*** UNIT COSTS: ***	0.59	19.42	0.08	136.00	6.80	162.29				
WC=1100		53.00 EA EELEB	31	1,029	4	7,208	360	8,602				
TOTAL DIVISION 16 ELECTRICAL							36	1,175	5	8,134	407	9,720
TOTAL FACILITY AA. ELECTRICAL							36	1,175	5	8,134	407	9,720
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE							36	1,175	5	8,134	407	9,720
TOTAL BASE BID							36	1,175	5	8,134	407	9,720
TOTAL ADDITIVE							0	0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY							36	1,175	5	8,134	407	9,720

*** END OF DETAIL REPORT ***

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6997E6

3-483

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6997

TIME 10:30:44

PROJECT NOTES

SUMMARY PAGE 1

PROJECT NOTES

ECO-6: INTERIOR LIGHTING

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY INTERIOR LIGHTING IN
SELECTED FACILITIES AT FT CAMPBELL.

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6997E6
3-484

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6997

TIME 10:30:44

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY	COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHR FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL	1.00 EA	9,720	10.0% 972	0.0% 0	7.5% 802	2.5% 287	0.0% 0	11,781 11781.21
BID ITEM TOTAL	1.00 EA	9,720	972	0	802	287	0	11,781	11781.21
TOTAL BASE BID		9,720	972	0	802	287	0	11,781	
TOTAL ADDITIVE		0	0	0	0	0	0	0	
TOTAL INCL ADD		9,720	972	0	802	287	0	11,781	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6997E6

3-485

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6997

TIME 10:30:44

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY	UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00	EA	11,781		11,781	11781.20
TOTAL CURRENT CONTRACT COST				11,781	0	11,781	
Cost Growth from 09/93 to 09/94 Index Values: 0000 0000		0.0%		0	0	0	
ESCALATED CONTRACT COST				11,781	0	11,781	
Government-Furnished Property				0		0	
SUBTOTAL				11,781	0	11,781	
Contingencies		10.0%		1,178	0	1,178	
SUBTOTAL				12,959	0	12,959	
SIOH (S&A)		5.5%		713	0	713	
CURRENT WORKING ESTIMATE				13,672	0	13,672	

Estimated Construction Time 365 Days

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6997E6

3-486

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6997

TIME 10:30:44

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PM	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT	W/TX	AMOUNT	PCT	W/OH&P	SUBTOTAL
AA	GENERAL/PRIME		1.00	EA	36	1,175	5	8,540		9,720	100.0%	0	9,720
	TOTAL DIRECT				36	1,175	5	8,540		9,720	100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6997E6
3-487

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6997

TIME 10:30:44

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PH	SUBTOTAL	*** OVERHEAD *** AMOUNT	PCT	HOFC%	**** PROFIT **** AMOUNT	PCT	BOND%	OTHER%	***** TOTAL CONTRACT ***** AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		9,720	972	10.0%	0.0	802	7.5%	2.5%	0.0%	11,781	100.0%	11781.21
	TOTAL OVERHEAD & PROFIT			972	10.0%		802	7.5%					

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6997E6

3-488

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6997

TIME 10:30:44

SI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	36	1,175	5	8,134	407	9,720
TOTAL DIRECT	36	1,175	5	8,134	407	9,720

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6997E6
3-489

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6997

TIME 10:30:44

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	36	1,175	5	8,134	407	9,720
TOTAL DIRECT	36	1,175	5	8,134	407	9,720

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6997E6
3-490

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6997

TIME 10:30:44

EQUIPMENT SUMMARY

SUMMARY PAGE 8

EQUIP DESCRIPTION	LIFE HRS	TL HRLY	OWNRSH	OWNS	OVTM	OWNRSH	EXPENSE	HRLY RATE	UPB RATE	HOURS	TOTAL COST
EMI20 SMALL TOOLS								1.40	1.40	3	5
TOTAL PROJECT EQUIPMENT HOURS										3	5

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 6997

TIME 10:30:44

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTH	TXS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	36	1,175
TOTAL PROJECT MANBOURS								36	1,175

*** END OF SUMMARY REPORT ***

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6997E6
3-492

FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

PAGE 1 OF 3

30 SEPTEMBER 1993

BUILDING WIDE FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 7855

BUILDING USE:

HOURS/DAY 12

DAYS/WEEK 5

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$11.78 PER KW

EXISTING FIXTURE DATA

4 FOOT

0 1 LAMP @ 48 W/FIXT = 0 WATTS
 0 1 LAMP @ 37.8 W/FIXT = 0 WATTS
 0 2 LAMP @ 96 W/FIXT = 0 WATTS
 35 2 LAMP @ 75.6 W/FIXT = 2646 WATTS
 0 3 LAMP @ 144 W/FIXT = 0 WATTS
 0 3 LAMP @ 113.4 W/FIXT = 0 WATTS
 0 4 LAMP @ 192 W/FIXT = 0 WATTS
 61 4 LAMP @ 151.2 W/FIXT = 9223 WATTS

2 FOOT

0 1 LAMP @ 31 W/FIXT = 0 WATTS
 0 4 LAMP @ 88 W/FIXT = 0 WATTS
 0 2 LAMP U @ 96 W/FIXT = 0 WATTS
 0 2 LAMP U @ 75.6 W/FIXT = 0 WATTS

8 FOOT

0 2 LAMP @ 180 W/FIXT = 0 WATTS
 0 2 LAMP @ 168 W/FIXT = 0 WATTS

REPLACEMENT FIXTURE DATA

4 FOOT

0 1 LAMP @ 37 W/FIXT = 0 WATTS
 35 1 LAMP W/ REFLECTORS 37 W/FIXT = 1295 WATTS
 0 2 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS
 61 2 LAMP W/ REFLECTORS 58 W/FIXT = 3538 WATTS

2 FOOT

0 1 LAMP @ 24 W/FIXT = 0 WATTS
 0 2 LAMP W/ REFLECTORS 41 W/FIXT = 0 WATTS
 0 2 LAMP U @ 58 W/FIXT = 0 WATTS

8 FOOT

0 1 LAMP W/ REFLECTORS 58 W/FIXT = 0 WATTS

TOTAL EXISTING KW 11.87

TOTAL REPLACEMENT KW 4.89

BASELINE ENERGY CONSUMPTION ***** MBTU

REPLACEMENT ENERGY CONSUMPTION

51.45 MBTU

NET ENERGY SAVINGS 74.90 MBTU/YR

NET DOLLAR SAVINGS \$1,458.72

FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

PAGE 2 OF 3

30 SEPTEMBER 1993

OVERLIT AREA FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 7855
AREA: OFFICE AREA

AREA USE:
HOURS/DAY 12
DAYS/WEEK 5

ELECTRIC COSTS:
ENERGY CHARGE \$0.0211 PER KWH
DEMAND CHARGE \$11.78 PER KW

EXISTING FIXTURE DATA

4 FOOT

1 LAMP @ 48 W/FIXT = 0 WATTS
1 LAMP @ 37.8 W/FIXT = 0 WATTS
2 LAMP @ 96 W/FIXT = 0 WATTS
2 LAMP @ 75.6 W/FIXT = 0 WATTS
3 LAMP @ 144 W/FIXT = 0 WATTS
3 LAMP @ 113.4 W/FIXT = 0 WATTS
4 LAMP @ 192 W/FIXT = 0 WATTS
9 4 LAMP @ 151.2 W/FIXT = 1360 WATTS

2 FOOT

1 LAMP @ 31 W/FIXT = 0 WATTS
4 LAMP @ 88 W/FIXT = 0 WATTS
2 LAMP U @ 96 W/FIXT = 0 WATTS
2 LAMP U @ 75.6 W/FIXT = 0 WATTS

8 FOOT

2 LAMP @ 180 W/FIXT = 0 WATTS
2 LAMP @ 168 W/FIXT = 0 WATTS

REPLACEMENT FIXTURE DATA

4 FOOT

0 1 LAMP @ 37 W/FIXT = 0 WATTS
0 1 LAMP @ 37 W/FIXT = 0 WATTS
0 2 LAMP @ 58 W/FIXT = 0 WATTS
9 2 LAMP @ 58 W/FIXT = 522 WATTS

2 FOOT

0 1 LAMP @ 24 W/FIXT = 0 WATTS
0 2 LAMP @ 41 W/FIXT = 0 WATTS
0 2 LAMP U @ 58 W/FIXT = 0 WATTS

8 FOOT

0 1 LAMP @ 58 W/FIXT = 0 WATTS

TOTAL EXISTING KW 1.360

TOTAL REPLACEMENT KW 0.522

BASELINE ENERGY CONSUMPTION 14.49 MBTU

REPLACEMENT ENERGY CONSUMPTION 5.56 MBTU

NET ENERGY SAVINGS 8.92 MBTU/YR

NET DOLLAR SAVINGS \$173.90

FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 3 OF 3

BUILDING WIDE INCANDESCENT LAMP REPLACEMENT

BUILDING #: 7855

LAMP USE:

HOURS/DAY 12

DAYS/WEEK 5

PEAK USE 1 (1-YES, 2-NO)

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$11.78 PER KW

EXISTING INCANDESCENTS

0 LAMPS @	25 WATTS =	0 WATTS
0 LAMPS @	40 WATTS =	0 WATTS
0 LAMPS @	52 WATTS =	0 WATTS
0 LAMPS @	60 WATTS =	0 WATTS
0 LAMPS @	75 WATTS =	0 WATTS
0 LAMPS @	90 WATTS =	0 WATTS
3 LAMPS @	100 WATTS =	300 WATTS

TOTAL EXISTING WATTS 300

BASELINE ENERGY CONSUMPTION 3.19 MBTU

COMPACT FLUORESCENT REPLACEMENT

0 LAMPS @	7 WATTS =	0 WATTS
0 LAMPS @	9 WATTS =	0 WATTS
0 LAMPS @	13 WATTS =	0 WATTS
0 LAMPS @	18 WATTS =	0 WATTS
3 LAMPS @	26 WATTS =	78 WATTS

TOTAL REPLACEMENT WATTS 78

REPLACEMENT ENERGY CONSUMPTION 0.83 MBTU

NET ENERGY SAVINGS 2.36 MBTU/YR

NET DOLLAR SAVINGS \$46.02

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 10:53:14

TITLE PAGE

ENERGY SAVINGS OPPORTUNITY SURVY
FT CAMPBELL, KY
ECO-6: BUILDING 7855

Contract No: 27-93-C-0096

Prepared By: Systems Corp
Estimator: Keith A. Derrington
Estimate Prep. Date: 09/30/93
Current UPB/CSI ID: ORL290

M - C A C E S E D I T I O N
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Release 4.20

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 7855E6

3-496

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 7855

TIME 10:53:14

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Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
 ECO-6: BUILDING 7855
 1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 10:53:14

TAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL		QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16500 LIGHTING										
16512 6100 SMALL FL FIXTURES (LESS THAN 40 WATT LAMPS)										
CD=3 EL 6107	SURF SQ W/1 26W BIAXIAL FL LAMP	***	UNIT COSTS: ***	1.25	41.26	0.00	31.00	1.55	73.81	
WC=1100	WHITE ACRYLIC LENS	3.00	EA EELEA	4	124	0	93	5	221	
16512 7000 FLUORESCENT - RECESSED T8 ELECTRONIC BALLAST										
CD=3 EL 7002	4 FT 1 LAMP PARABOLIC LOUVRE W/	***	UNIT COSTS: ***	0.54	17.84	0.07	122.00	6.10	146.01	
WC=1100	REFLECTOR	35.00	EA EELEB	19	625	2	4,270	214	5,110	
CD=3 EL 7003	4 FT 2 LAMP PARABOLIC LOUVRE W/	***	UNIT COSTS: ***	0.59	19.42	0.08	136.00	6.80	162.29	
WC=1100	REFLECTOR	61.00	EA EELEB	36	1,184	5	8,296	415	9,900	
CD=3 EL 7008	4 FT 2 LAMP PARABOLIC LOUVRE	***	UNIT COSTS: ***	0.50	16.51	0.06	120.00	6.00	142.57	
WC=1100		9.00	EA EELEB	5	149	1	1,080	54	1,283	
TOTAL DIVISION 16 ELECTRICAL					63	2,081	8	13,739	687	16,515
TOTAL FACILITY AA. ELECTRICAL					63	2,081	8	13,739	687	16,515
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE					63	2,081	8	13,739	687	16,515
TOTAL BASE BID					63	2,081	8	13,739	687	16,515
TOTAL ADDITIVE					0	0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY					63	2,081	8	13,739	687	16,515

* * * END OF DETAIL REPORT * * *

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 7855E6
 3-498

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 7855

TIME 10:53:14

PROJECT NOTES

SUMMARY PAGE 1

PROJECT NOTES

ECO-6: INTERIOR LIGHTING

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY INTERIOR LIGHTING IN
SELECTED FACILITIES AT FT CAMPBELL.

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 7855E6

3-499

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
 ECO-6: BUILDING 7855

TIME 10:53:14

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY	COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHER FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL	1.00 EA	16,515	10.0% 1,651	0.0% 0	7.5% 1,362	2.5% 488	0.0% 0	20,017 20017.13
BID ITEM TOTAL	1.00 EA	16,515	1,651	0	1,362	488	0	20,017	20017.13
TOTAL BASE BID		16,515	1,651	0	1,362	488	0	20,017	
TOTAL ADDITIVE		0	0	0	0	0	0	0	
TOTAL INCL ADD		16,515	1,651	0	1,362	488	0	20,017	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 7855E6

3-500

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 7855

TIME 10:53:14

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY	UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00	EA	20,017		20,017	20017.10
	TOTAL CURRENT CONTRACT COST			20,017	0	20,017	
	Cost Growth from 09/93 to 09/94 Index Values: 0000 0000	0.0%		0	0	0	
	ESCALATED CONTRACT COST			20,017	0	20,017	
	Government-Furnished Property			0		0	
	SUBTOTAL			20,017	0	20,017	
	Contingencies	10.0%		2,002	0	2,002	
	SUBTOTAL			22,019	0	22,019	
	SIOH (S&A)	5.5%		1,211	0	1,211	
	CURRENT WORKING ESTIMATE			23,230	0	23,230	
	Estimated Construction Time	365	Days				

CPEW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 7855E6

3-501

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 7855

TIME 10:53:14

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PH	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT W/TX	AMOUNT	PCT	W/OH&P	SUBTOTAL
AA	GENERAL/PRIME		1.00	EA	63	2,081	8	14,426	16,515	100.0%	0	16,515
	TOTAL DIRECT				63	2,081	8	14,426	16,515	100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 7855E6

3-502

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 7855

TIME 10:53:14

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PH	SUBTOTAL	*** OVERHEAD ***	AMOUNT	PCT	HOFC%	**** PROFIT ****	AMOUNT	PCT	BOND%	OTHR%	***** TOTAL CONTRACT *****	AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		16,515	1,651	10.0%	0.0		1,362	7.5%	2.5%	0.0%		20,017	100.0%		20017.12
	TOTAL OVERHEAD & PROFIT			1,651	10.0%			1,362	7.5%							

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 7855E6

3-503

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 7855

TIME 10:53:14

SI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	63	2,081	8	13,739	687	16,515
TOTAL DIRECT	63	2,081	8	13,739	687	16,515

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 7855E6
3-504

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 7855

TIME 10:53:14

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	63	2,081	8	13,739	687	16,515
TOTAL DIRECT	63	2,081	8	13,739	687	16,515

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 7855E6
3-505

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 7855

TIME 10:53:14

EQUIPMENT SUMMARY

SUMMARY PAGE 8

EQUIP DESCRIPTION	LIFE HRS	TL HRLY	OWNRSH	OWNS	OVTM	OWNRSH	EXPENSE	RATE	RATE	HOURS	COST
ENI20 SMALL TOOLS								1.40	1.40	6	8
TOTAL PROJECT EQUIPMENT HOURS										6	8

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 7855E6
3-506

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 7855

TIME 10:53:14

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	63	2,081
TOTAL PROJECT MANHOURS								63	2,081

*** END OF SUMMARY REPORT ***

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 7855E6
3-507

FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 1 OF 2

BUILDING WIDE FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 7856

BUILDING USE:

HOURS/DAY 10
DAYS/WEEK 5

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH
DEMAND CHARGE \$11.78 PER KW

EXISTING FIXTURE DATA

REPLACEMENT FIXTURE DATA

4 FOOT

0 1 LAMP @	48 W/FXT =	0 WATTS	0 1 LAMP @	37 W/FXT =	0 WATTS
0 1 LAMP @	37.8 W/FXT =	0 WATTS	21 1 LAMP W/ REFLECTORS	37 W/FXT =	777 WATTS
21 2 LAMP @	96 W/FXT =	2016 WATTS	0 2 LAMP W/ REFLECTORS	58 W/FXT =	0 WATTS
0 2 LAMP @	75.6 W/FXT =	0 WATTS	102 2 LAMP W/ REFLECTORS	58 W/FXT =	5916 WATTS
0 3 LAMP @	144 W/FXT =	0 WATTS			
0 3 LAMP @	113.4 W/FXT =	0 WATTS			
102 4 LAMP @	192 W/FXT =	19584 WATTS			
0 4 LAMP @	151.2 W/FXT =	0 WATTS			

2 FOOT

0 1 LAMP @	31 W/FXT =	0 WATTS	0 1 LAMP @	24 W/FXT =	0 WATTS
0 4 LAMP @	88 W/FXT =	0 WATTS	0 2 LAMP W/ REFLECTORS	41 W/FXT =	0 WATTS
0 2 LAMP U @	96 W/FXT =	0 WATTS	0 2 LAMP U @	58 W/FXT =	0 WATTS
0 2 LAMP U @	75.6 W/FXT =	0 WATTS			

8 FOOT

0 2 LAMP @	180 W/FXT =	0 WATTS	0 1 LAMP W/ REFLECTORS	58 W/FXT =	0 WATTS
0 2 LAMP @	168 W/FXT =	0 WATTS			

TOTAL EXISTING KW 21.60

TOTAL REPLACEMENT KW 6.69

BASELINE ENERGY CONSUMPTION 191.61 MBTU

REPLACEMENT ENERGY CONSUMPTION 59.97 MBTU

3-508

NET ENERGY SAVINGS 132.24 MBTU/YR

NET DOLLAR SAVINGS \$2,926.60

FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 2 OF 2

BUILDING WIDE INCANDESCENT LAMP REPLACEMENT

BUILDING #: 7856

LAMP USE:

HOURS/DAY 10

DAYS/WEEK 5

PEAK USE 1 (1-YES, 2-NO)

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$11.78 PER KW

EXISTING INCANDESCENTS

0 LAMPS @ 25 WATTS =	0 WATTS
0 LAMPS @ 40 WATTS =	0 WATTS
1 LAMPS @ 52 WATTS =	52 WATTS
0 LAMPS @ 60 WATTS =	0 WATTS
0 LAMPS @ 75 WATTS =	0 WATTS
0 LAMPS @ 90 WATTS =	0 WATTS
0 LAMPS @ 100 WATTS =	0 WATTS
TOTAL EXISTING WATTS	52

BASELINE ENERGY CONSUMPTION

0.46 MBTU

COMPACT FLUORESCENT REPLACEMENT

0 LAMPS @ 7 WATTS =	0 WATTS
0 LAMPS @ 9 WATTS =	0 WATTS
1 LAMPS @ 13 WATTS =	13 WATTS
0 LAMPS @ 18 WATTS =	0 WATTS
0 LAMPS @ 26 WATTS =	0 WATTS
TOTAL REPLACEMENT WATTS	13

REPLACEMENT ENERGY CONSUMPTION

0.12 MBTU

NET ENERGY SAVINGS 0.34 MBTU/YR

NET DOLLAR SAVINGS \$7.66

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 12:16:50

TITLE PAGE

ENERGY SAVINGS OPPORTUNITY SURVY
FT CAMPBELL, KY
ECO-6: BUILDING 7856

Contract No: 27-93-C-0096

Prepared By: Systems Corp
Estimator: Keith A. Derrington
Estimate Prep. Date: 09/30/93
Current UPB/CSI ID: ORL290

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CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 7856E6

3-510

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 7856

TIME 12:16:50

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DETAILED ESTIMATE	DETAIL PAGE
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1. BUILDING TO THE 5 FOOT LINE	
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Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
 ECO-6: BUILDING 7856
 1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 12:16:50

TAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL		QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16500 LIGHTING										
16512 6100 SMALL FL FIXTURES (LESS THAN 40 WATT LAMPS)										
CD=3 EL 6105	SURF SQ W/1 13W BIAxIAL FL LAMP *** UNIT COSTS: ***	1.25				41.26	0.00	27.80	1.39	70.45
WC=1100	WHITE ACRYLIC LENS 1.00 EA EELEA	1				41	0	28	1	70
16512 7000 FLUORESCENT - RECESSED T8 ELECTRONIC BALLAST										
CD=3 EL 7002	4 FT 1 LAMP PARABOLIC LOUVRE W/ *** UNIT COSTS: ***	0.54				17.84	0.07	122.00	6.10	146.01
WC=1100	REFLECTOR 21.00 EA EELEB	11				375	1	2,562	128	3,066
CD=3 EL 7003	4 FT 2 LAMP PARABOLIC LOUVRE W/ *** UNIT COSTS: ***	0.59				19.42	0.08	136.00	6.80	162.29
WC=1100	REFLECTOR 102.00 EA EELEB	60				1,981	8	13,872	694	16,554
TOTAL DIVISION 16 ELECTRICAL		73				2,397	9	16,462	823	19,691
TOTAL FACILITY AA. ELECTRICAL		73				2,397	9	16,462	823	19,691
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE		73				2,397	9	16,462	823	19,691
TOTAL BASE BID		73				2,397	9	16,462	823	19,691
TOTAL ADDITIVE		0				0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY		73				2,397	9	16,462	823	19,691

*** END OF DETAIL REPORT ***

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 7856E6

3-512

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 7856

TIME 12:16:50

PROJECT NOTES

SUMMARY PAGE 1

PROJECT NOTES

ECO-6: INTERIOR LIGHTING

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY INTERIOR LIGHTING IN
SELECTED FACILITIES AT FT CAMPBELL.

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 7856E6

3-513

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 7856

TIME 12:16:50

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY		COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHR FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL	1.00 EA	19,691	10.0% 1,969	0.0% 0	7.5% 1,624	2.5% 582	0.0% 0	23,866	23866.31
<hr/>										
BID ITEM TOTAL		1.00 EA	19,691	1,969	0	1,624	582	0	23,866	23866.31
<hr/>										
TOTAL BASE BID			19,691	1,969	0	1,624	582	0	23,866	
TOTAL ADDITIVE			0	0	0	0	0	0	0	
<hr/>										
TOTAL INCL ADD			19,691	1,969	0	1,624	582	0	23,866	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 7856E6
3-514

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 7856

TIME 12:16:50

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00 EA	23,866		23,866	23866.30
	TOTAL CURRENT CONTRACT COST		23,866	0	23,866	
	Cost Growth from 09/93 to 09/94 Index Values: 0000 0000	0.0%	0	0	0	
	ESCALATED CONTRACT COST		23,866	0	23,866	
	Government-Furnished Property		0		0	
	SUBTOTAL		23,866	0	23,866	
	Contingencies	10.0%	2,387	0	2,387	
	SUBTOTAL		26,253	0	26,253	
	SIOH (S&A)	5.5%	1,444	0	1,444	
	CURRENT WORKING ESTIMATE		27,697	0	27,697	
	Estimated Construction Time	365 Days				

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 7856E6

3-515

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 7856

TIME 12:16:50

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PM	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT	W/TX	** TOTAL DIRECT *	* SUBCON *	AMOUNT	PCT	W/OH&P	SUBTOTAL
AA	GENERAL/PRIME		1.00	EA	73	2,397	9	17,285		19,691	100.0%			0	19,691
	TOTAL DIRECT				73	2,397	9	17,285		19,691	100.0%				

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 7856E6

3-516

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 7856

TIME 12:16:50

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PM	SUBTOTAL	*** OVERHEAD *** AMOUNT	PCT	HOFC%	**** PROFIT **** AMOUNT	PCT	BOND%	OTHER%	***** TOTAL CONTRACT ***** AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		19,691	1,969	10.0%	0.0	1,624	7.5%	2.5%	0.0%	23,866	100.0%	23866.32
	TOTAL OVERHEAD & PROFIT			1,969	10.0%		1,624	7.5%					

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 7856E6

3-517

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 7856

TIME 12:16:50

CSI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	73	2,397	9	16,462	823	19,691
TOTAL DIRECT	73	2,397	9	16,462	823	19,691

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 7856E6

3-518

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 7856

TIME 12:16:50

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	73	2,397	9	16,462	823	19,691
TOTAL DIRECT	73	2,397	9	16,462	823	19,691

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 7856E6
3-519

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 7856

TIME 12:16:50

EQUIPMENT SUMMARY

SUMMARY PAGE 8

EQUIP DESCRIPTION	LIFE HRS	TL HRLY	OWNRSH	OWNS	OVTM	OWNRSH	EXPENSE	HRLY RATE	UPB RATE	HOURS	TOTAL COST
EMI20 SMALL TOOLS								1.40	1.40	7	9
TOTAL PROJECT EQUIPMENT HOURS										7	9

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: BUILDING 7856

TIME 12:16:50

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	73	2,397
TOTAL PROJECT MANHOURS								73	2,397

* * * END OF SUMMARY REPORT * * *

FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 1 OF 1

MERCURY VAPOR STREET LIGHT REPLACEMENT

AREA: STRYKER VILLAGE

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

FIXTURE USE: 5200 HR/YR

DEMAND CHARGE \$11.78 PER KW

EXISTING MERCURY VAPOR FIXTURES

175 WATT LAMPS

0 FIXTURES @ 210 W/FIXT = 0 WATTS

BASELINE ENERGY CONSUMPTION 0 KWH

400 WATT LAMPS

1 FIXTURES @ 454 W/FIXT = 454 WATTS

BASELINE ENERGY CONSUMPTION 2361 KWH

REPLACEMENT HIGH PRESSURE SODIUM FIXTURES

100 WATT LAMPS

0 FIXTURES @ 130 W/FIXT = 0 WATTS

REPLACEMENT ENERGY CONSUMPTION 0 KWH

100 WATT LAMPS

1 FIXTURES @ 130 W/FIXT = 130 WATTS

REPLACEMENT ENERGY CONSUMPTION 676 KWH

NET BASELINE ENERGY CONSUMPTION 8.06 MBTU/YR NET RPLCMT ENERGY CONSUMPTION 2.31 MBTU/YR

NET ENERGY SAVINGS 5.74 MBTU/YR NET DOLLAR SAVINGS \$39.43

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 12:39:24

TITLE PAGE

ENERGY SAVINGS OPPORTUNITY SURVY
FT CAMPBELL, KY
ECO-6: STRYKER VILLAGE

Contract No: 27-93-C-0096

Prepared By: Systems Corp
Estimator: Keith A. Derrington
Estimate Prep. Date: 08/31/93
Current UPB/CSI ID: ORL290

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CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: SVECO6

3-523

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: STRYKER VILLAGE

TIME 12:39:24

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DETAILED ESTIMATE

DETAIL PAGE

1. BUILDING TO THE 5 FOOT LINE	
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Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: STRYKER VILLAGE
1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 12:39:24

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL	QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16500 LIGHTING									
16524 3000 HIGH PRESSURE SODIUM									
CD=4 EL 3101 FIXTURE 402C 100 WATT	***	UNIT COSTS: ***		2.73	82.31	8.11	146.48	7.32	244.23
WC=1100		1.00 EA EELEK		3	82	8	146	7	244
TOTAL DIVISION 16 ELECTRICAL				3	82	8	146	7	244
TOTAL FACILITY AA. ELECTRICAL				3	82	8	146	7	244
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE				3	82	8	146	7	244
TOTAL BASE BID				3	82	8	146	7	244
TOTAL ADDITIVE				0	0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY				3	82	8	146	7	244

*** END OF DETAIL REPORT ***

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: SVECO6

3-525

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: STRYKER VILLAGE

TIME 12:39:24

PROJECT NOTES

SUMMARY PAGE 1

PROJECT NOTES

ECO-6: STREET LIGHTS

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY STREET LIGHTING IN SELECTED
FAMILY HOUSING AREAS.

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: SVECO6

3-526

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
 ECO-6: STRYKER VILLAGE

TIME 12:39:24

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY	COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHR FCTR	TOTAL COST	UNIT COST	
AA	ELECTRICAL	1.00 EA	244	10.0% 24	0.0% 0	7.5% 20	2.5% 7	0.0% 0	296	296.02
BID ITEM TOTAL		1.00 EA	244	24	0	20	7	0	296	296.02
TOTAL BASE BID			244	24	0	20	7	0	296	
TOTAL ADDITIVE			0	0	0	0	0	0	0	
TOTAL INCL ADD			244	24	0	20	7	0	296	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: SVECO6

3-527

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
 ECO-6: STRYKER VILLAGE

TIME 12:39:24

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY	UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00	EA	296		296	296.00
	TOTAL CURRENT CONTRACT COST			296	0	296	
	Cost Growth from 08/93 to 08/94 Index Values: 0000 0000	0.0%		0	0	0	
	ESCALATED CONTRACT COST			296	0	296	
	Government-Furnished Property			0		0	
	SUBTOTAL			296	0	296	
	Contingencies	10.0%		30	0	30	
	SUBTOTAL			326	0	326	
	SIOH (S&A)	5.5%		18	0	18	
	CURRENT WORKING ESTIMATE			344	0	344	

Estimated Construction Time 365 Days

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: SVECO6

3-528

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: STRYKER VILLAGE

TIME 12:39:24

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PM	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT	W/TX	AMOUNT	PCT	W/OH&P	SUBTOTAL
AA	GENERAL/PRIME		1.00	EA	3	82	8	154		244	100.0%	0	244
	TOTAL DIRECT				3	82	8	154		244	100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: SVECO6
3-529

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: STRYKER VILLAGE

TIME 12:39:24

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PH	SUBTOTAL	AMOUNT	PCT	HOFC%	AMOUNT	PCT	BOND%	OTHR%	AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		244	24	10.0%	0.0	20	7.5%	2.5%	0.0%	296	100.0%	296.02
	TOTAL OVERHEAD & PROFIT			24	10.0%		20	7.5%					

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: SVECO6
3-530

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: STRYKER VILLAGE

TIME 12:39:24

SI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	3	82	8	146	7	244
TOTAL DIRECT	3	82	8	146	7	244

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: SVECO6

3-531

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: STRYKER VILLAGE

TIME 12:39:24

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	3	82	8	146	7	244
TOTAL DIRECT	3	82	8	146	7	244

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: SVEC06
3-532

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: STRYKER VILLAGE

TIME 12:39:24

EQUIPMENT SUMMARY

SUMMARY PAGE 8

----- *** BOOK VALUE ***		ADJ FACTOR	ADJUSTD	BOOK OP	--	HRLY	---	UPB	****	TOTAL	****		
EQUIP	DESCRIPTION	LIFE HRS	TL HRLY	OWNRSH	OWNS	OVTM	OWNRSH	EXPENSE	RATE	RATE	HOURS	COST	
EMI20	SMALL TOOLS								1.40	1.40	0	0	
ETR90	LINE TRUCK								19.86	19.86	0	8	

TOTAL PROJECT EQUIPMENT HOURS												1	8

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: SVECO6

3-533

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: STRYKER VILLAGE

TIME 12:39:24

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTM	TYS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	3	82
TOTAL PROJECT MANHOURS								3	82

*** END OF SUMMARY REPORT ***

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: SVECO6
3-534

FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 1 OF 1

MERCURY VAPOR STREET LIGHT REPLACEMENT

AREA: GARDNER HILLS

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

FIXTURE USE: 5200 HR/YR

DEMAND CHARGE \$11.78 PER KW

EXISTING MERCURY VAPOR FIXTURES

175 WATT LAMPS

0 FIXTURES @ 210 W/FIXT = 0 WATTS

BASELINE ENERGY CONSUMPTION 0 KWH

400 WATT LAMPS

14 FIXTURES @ 454 W/FIXT = 6356 WATTS

BASELINE ENERGY CONSUMPTION 33051 KWH

REPLACEMENT HIGH PRESSURE SODIUM FIXTURES

100 WATT LAMPS

0 FIXTURES @ 130 W/FIXT = 0 WATTS

REPLACEMENT ENERGY CONSUMPTION 0 KWH

100 WATT LAMPS

14 FIXTURES @ 130 W/FIXT = 1820 WATTS

REPLACEMENT ENERGY CONSUMPTION 9464 KWH

NET BASELINE ENERGY CONSUMPTION 112.77 MBTU/YR NET RPLCMT ENERGY CONSUMPTION 32.29 MBTU/YR

NET ENERGY SAVINGS 80.4 MBTU/YR

NET DOLLAR SAVINGS \$552.07

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 12:47:27

TITLE PAGE

ENERGY SAVINGS OPPORTUNITY SURVY
FT CAMPBELL, KY
ECO-6: GARDNER HILLS

Contract No: 27-93-C-0096

Prepared By: Systems Corp
Estimator: Keith A. Derrington
Estimate Prep. Date: 08/31/93
Current UPB/CSI ID: ORL290

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CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: GHECO6

3-536

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: GARDNER HILLS

TIME 12:47:27

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Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: GARDNER HILLS
1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 12:47:27

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL	QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16500 LIGHTING									
16524 3000 HIGH PRESSURE SODIUM									
CD=4 EL 3101 FIXTURE 402C 100 WATT	***	UNIT COSTS: ***		2.73	82.31	8.11	146.48	7.32	244.23
WC=1100	14.00	EA	EELEK	38	1,152	114	2,051	103	3,419
TOTAL DIVISION 16 ELECTRICAL				38	1,152	114	2,051	103	3,419
TOTAL FACILITY AA. ELECTRICAL				38	1,152	114	2,051	103	3,419
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE				38	1,152	114	2,051	103	3,419
TOTAL BASE BID				38	1,152	114	2,051	103	3,419
TOTAL ADDITIVE				0	0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY				38	1,152	114	2,051	103	3,419

* * * END OF DETAIL REPORT * * *

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: GHECO6
3-538

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: GARDNER HILLS

TIME 12:47:27

PROJECT NOTES

SUMMARY PAGE 1

PROJECT NOTES

ECO-6: STREET LIGHTS

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY STREET LIGHTING IN SELECTED
FAMILY HOUSING AREAS.

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: GHECO6

3-539

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: GARDNER HILLS

TIME 12:47:27

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY	COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHR FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL	1.00 EA	3,419	10.0% 342	0.0% 0	7.5% 282	2.5% 101	0.0% 0	4,144 4144.26
BID ITEM TOTAL	1.00 EA	3,419	342	0	282	101	0	4,144	4144.26
TOTAL BASE BID		3,419	342	0	282	101	0	4,144	
TOTAL ADDITIVE		0	0	0	0	0	0	0	
TOTAL INCL ADD		3,419	342	0	282	101	0	4,144	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: GHEC06

3-540

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: GARDNER HILLS

TIME 12:47:27

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY	UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00	EA	4,144		4,144	4144.30
	TOTAL CURRENT CONTRACT COST			4,144	0	4,144	
	Cost Growth from 08/93 to 08/94 Index Values: 0000 0000	0.0%		0	0	0	
	ESCALATED CONTRACT COST			4,144	0	4,144	
	Government-Furnished Property			0		0	
	SUBTOTAL			4,144	0	4,144	
	Contingencies	10.0%		414	0	414	
	SUBTOTAL			4,559	0	4,559	
	SIOH (S&A)	5.5%		251	0	251	
	CURRENT WORKING ESTIMATE			4,809	0	4,809	

Estimated Construction Time 365 Days

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: GHEC06

3-541

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: GARDNER HILLS

TIME 12:47:27

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PM	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT W/TX	AMOUNT	PCT	W/OH&P	SUBTOTAL
AA	GENERAL/PRIME		1.00	EA	38	1,152	114	2,153	3,419	100.0%	0	3,419
	TOTAL DIRECT				38	1,152	114	2,153	3,419	100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: GHEC06
3-542

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: GARDNER HILLS

TIME 12:47:27

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PK	SUBTOTAL	*** OVERHEAD ***	AMOUNT	PCT	HOFC%	**** PROFIT ****	AMOUNT	PCT	BOND%	OTHR%	***** TOTAL CONTRACT *****	AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		3,419	342	10.0%	0.0		282	7.5%	2.5%	0.0%		4,144	100.0%		4144.27
	TOTAL OVERHEAD & PROFIT			342	10.0%			282	7.5%							

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: GHECO6
3-543

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: GARDNER HILLS

TIME 12:47:27

CSI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	38	1,152	114	2,051	103	3,419
TOTAL DIRECT	38	1,152	114	2,051	103	3,419

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: GHEC06
3-544

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: GARDNER HILLS

TIME 12:47:27

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	38	1,152	114	2,051	103	3,419
TOTAL DIRECT	38	1,152	114	2,051	103	3,419

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: GHEC06
3-545

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: GARDNER HILLS

TIME 12:47:27

EQUIPMENT SUMMARY

SUMMARY PAGE 8

EQUIP DESCRIPTION	LIFE HRS	TL HRLY	OWNRSH	OWNS	OVTM	OWNRSH	EXPENSE	HELY RATE	UPB RATE	HOURS	TOTAL COST
EMI20 SMALL TOOLS								1.40	1.40	4	5
ETR90 LINE TRUCK								19.86	19.86	6	108
										9	114
TOTAL PROJECT EQUIPMENT HOURS											

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: GHEC06
3-546

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: GARDNER HILLS

TIME 12:47:27

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTH	TXS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	38	1,153
TOTAL PROJECT MANHOURS								38	1,153

*** END OF SUMMARY REPORT ***

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: GHECO6

3-547

FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 1 OF 1

MERCURY VAPOR STREET LIGHT REPLACEMENT

AREA: COLE PARK

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

DEMAND CHARGE \$11.78 PER KW

FIXTURE USE: 5200 HR/YR

EXISTING MERCURY VAPOR FIXTURES

175 WATT LAMPS

0 FIXTURES @ 210 W/FIXT = 0 WATTS

BASELINE ENERGY CONSUMPTION 0 KWH

400 WATT LAMPS

22 FIXTURES @ 454 W/FIXT = 9988 WATTS

BASELINE ENERGY CONSUMPTION 51938 KWH

REPLACEMENT HIGH PRESSURE SODIUM FIXTURES

100 WATT LAMPS

0 FIXTURES @ 130 W/FIXT = 0 WATTS

REPLACEMENT ENERGY CONSUMPTION 0 KWH

100 WATT LAMPS

22 FIXTURES @ 130 W/FIXT = 2860 WATTS

REPLACEMENT ENERGY CONSUMPTION 14872 KWH

NET BASELINE ENERGY CONSUMPTION 177.21 MBTU/YR NET RPLCMT ENERGY CONSUMPTION 50.74 MBTU/YR

NET ENERGY SAVINGS 126.46 MBTU/YR NET DOLLAR SAVINGS \$867.53

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 12:54:13

TITLE PAGE

ENERGY SAVINGS OPPORTUNITY SURVY
FT CAMPBELL, KY
ECO-6: COLE PARK

Contract No: 27-93-C-0096

Prepared By: Systems Corp
Estimator: Keith A. Derrington
Estimate Prep. Date: 08/31/93
Current UPB/CSI ID: ORL290

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CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: CPEC06

3-549

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: COLE PARK

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Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
 ECO-6: COLE PARK
 1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 12:54:13

TAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL	QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16500 LIGHTING									
16524 3000 HIGH PRESSURE SODIUM									
CD=4 EL 3101 FIXTURE 402C 100 WATT	*** UNIT COSTS: ***			2.73	82.31	8.11	146.48	7.32	244.23
WC=1100	22.00 EA EELEK			60	1,811	179	3,223	161	5,373
TOTAL DIVISION 16 ELECTRICAL				60	1,811	179	3,223	161	5,373
TOTAL FACILITY AA. ELECTRICAL				60	1,811	179	3,223	161	5,373
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE				60	1,811	179	3,223	161	5,373
TOTAL BASE BID				60	1,811	179	3,223	161	5,373
TOTAL ADDITIVE				0	0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY				60	1,811	179	3,223	161	5,373

*** END OF DETAIL REPORT ***

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: CPEC06

3-551

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: COLE PARK

TIME 12:54:13

PROJECT NOTES

SUMMARY PAGE 1

PROJECT NOTES

ECO-6: STREET LIGHTS

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY STREET LIGHTING IN SELECTED
FAMILY HOUSING AREAS.

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: CPEC06
3-552

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: COLE PARK

TIME 12:54:13

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY		COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHR FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL									
		1.00 EA	5,373	10.0% 537	0.0% 0	7.5% 443	2.5% 159	0.0% 0	6,512	6512.41
BID ITEM TOTAL		1.00 EA	5,373	537	0	443	159	0	6,512	6512.41
TOTAL BASE BID			5,373	537	0	443	159	0	6,512	
TOTAL ADDITIVE			0	0	0	0	0	0	0	
TOTAL INCL ADD			5,373	537	0	443	159	0	6,512	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: CPEC06

3-553

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: COLE PARK

TIME 12:54:13

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY	UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00	EA	6,512		6,512	6512.40
	TOTAL CURRENT CONTRACT COST			6,512	0	6,512	
	Cost Growth from 08/93 to 08/94 Index Values: 0000 0000	0.0%		0	0	0	
	ESCALATED CONTRACT COST			6,512	0	6,512	
	Government-Furnished Property			0		0	
	SUBTOTAL			6,512	0	6,512	
	Contingencies	10.0%		651	0	651	
	SUBTOTAL			7,164	0	7,164	
	SIOH (S&A)	5.5%		394	0	394	
	CURRENT WORKING ESTIMATE			7,558	0	7,558	
	Estimated Construction Time	365	Days				

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: CPEC06
3-554

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: COLE PARK

TIME 12:54:13

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PM	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT W/TX	AMOUNT	PCT	W/OH&P	SUBTOTAL
AA	GENERAL/PRIME		1.00	EA	60	1,811	179	3,384	5,373	100.0%	0	5,373
	TOTAL DIRECT				60	1,811	179	3,384	5,373	100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: CPEC06

3-555

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: COLE PARK

TIME 12:54:13

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PH	SUBTOTAL	*** OVERHEAD ***	AMOUNT	PCT	HOFC%	**** PROFIT ****	AMOUNT	PCT	BOND%	OTHER%	***** TOTAL CONTRACT *****	AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		5,373	537	10.0%	0.0		443	7.5%	2.5%	0.0%		6,512	100.0%		6512.42
	TOTAL OVERHEAD & PROFIT			537	10.0%			443	7.5%							

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: CPEC06

3-556

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: COLE PARK

TIME 12:54:13

CSI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	60	1,811	179	3,223	161	5,373
TOTAL DIRECT	60	1,811	179	3,223	161	5,373

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: CPEC06

3-557

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: COLE PARK

TIME 12:54:13

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	60	1,811	179	3,223	161	5,373
TOTAL DIRECT	60	1,811	179	3,223	161	5,373

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: CPEC06
3-558

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: COLE PARK

TIME 12:54:13

EQUIPMENT SUMMARY

SUMMARY PAGE 8

----- *** BOOK VALUE ***		ADJ FACTOR	ADJUSTD	BOOK OP	--	HRLY	---	UPB	****	TOTAL	****		
EQUIP	DESCRIPTION	LIFE HRS	TL	HRLY	OWNRSH	OWNS	OVTM	OWNRSH	EXPENSE	RATE	RATE	HOURS	COST
EMI20	SMALL TOOLS								1.40	1.40		6	8
ETR90	LINE TRUCK								19.86	19.86		9	170
												-----	-----
TOTAL PROJECT EQUIPMENT HOURS												14	179

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: COLE PARK

TIME 12:54:13

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTH	TXS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	60	1,811
TOTAL PROJECT MANHOURS								60	1,811

*** END OF SUMMARY REPORT ***

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: CPEC06

3-560

FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 1 OF 1

MERCURY VAPOR STREET LIGHT REPLACEMENT

AREA: DRENNAN PARK

ELECTRIC COSTS:

FIXTURE USE: 5200 HR/YR
 ENERGY CHARGE \$0.0211 PER KWH
 DEMAND CHARGE \$11.78 PER KW

EXISTING MERCURY VAPOR FIXTURES

175 WATT LAMPS

0 FIXTURES @ 210 W/FIXT = 0 WATTS
 BASELINE ENERGY CONSUMPTION 0 KWH

400 WATT LAMPS

16 FIXTURES @ 454 W/FIXT = 7264 WATTS
 BASELINE ENERGY CONSUMPTION 37773 KWH

REPLACEMENT HIGH PRESSURE SODIUM FIXTURES

100 WATT LAMPS

0 FIXTURES @ 130 W/FIXT = 0 WATTS
 REPLACEMENT ENERGY CONSUMPTION 0 KWH

100 WATT LAMPS

16 FIXTURES @ 130 W/FIXT = 2080 WATTS
 REPLACEMENT ENERGY CONSUMPTION 10816 KWH

NET BASELINE ENERGY CONSUMPTION

128.88 MBTU/YR

NET REPLCMT ENERGY CONSUMPTION

36.90 MBTU/YR

NET ENERGY SAVINGS

91.98 MBTU/YR

NET DOLLAR SAVINGS

\$630.93

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 13:08:45

TITLE PAGE

ENERGY SAVINGS OPPORTUNITY SURVY
FT CAMPBELL, KY
ECO-6: DRENNAN PARK

Contract No: 27-93-C-0096

Prepared By: Systems Corp
Estimator: Keith A. Derrington
Estimate Prep. Date: 08/31/93
Current UPB/CSI ID: ORL290

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CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: DPEC06

3-562

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: DRENNAN PARK

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Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: DRENNAN PARK
1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 13:08:45

TAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL	QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16500 LIGHTING									
16524 3000 HIGH PRESSURE SODIUM									
CD=4 EL 3101 FIXTURE 402C 100 WATT	***	UNIT COSTS: ***		2.73	82.31	8.11	146.48	7.32	244.23
WC=1100	16.00	EA	EELEK	44	1,317	130	2,344	117	3,908
TOTAL DIVISION 16 ELECTRICAL				44	1,317	130	2,344	117	3,908
TOTAL FACILITY AA. ELECTRICAL				44	1,317	130	2,344	117	3,908
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE				44	1,317	130	2,344	117	3,908
TOTAL BASE BID				44	1,317	130	2,344	117	3,908
TOTAL ADDITIVE				0	0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY				44	1,317	130	2,344	117	3,908

* * * END OF DETAIL REPORT * * *

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: DPEC06

3-564

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: DRENNAN PARK

TIME 13:08:45

PROJECT NOTES

SUMMARY PAGE 1

PROJECT NOTES

ECO-6: STREET LIGHTS

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY STREET LIGHTING IN SELECTED
FAMILY HOUSING AREAS.

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: DPEC06

3-565

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
 ECO-6: DRENNAN PARK

TIME 13:08:45

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY	COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHER FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL	1.00 EA	3,908	10.0% 391	0.0% 0	7.5% 322	2.5% 116	0.0% 0	4,736 4736.30
BID ITEM TOTAL	1.00 EA	3,908	391	0	322	116	0	4,736	4736.30
TOTAL BASE BID		3,908	391	0	322	116	0	4,736	
TOTAL ADDITIVE		0	0	0	0	0	0	0	
TOTAL INCL ADD		3,908	391	0	322	116	0	4,736	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: DPEC06

3-566

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: DRENNAN PARK

TIME 13:08:45

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00 EA	4,736		4,736	4736.30
	TOTAL CURRENT CONTRACT COST		4,736	0	4,736	
	Cost Growth from 08/93 to 08/94 Index Values: 0000 0000	0.0%	0	0	0	
	ESCALATED CONTRACT COST		4,736	0	4,736	
	Government-Furnished Property		0		0	
	SUBTOTAL		4,736	0	4,736	
	Contingencies	10.0%	474	0	474	
	SUBTOTAL		5,210	0	5,210	
	SIOH (S&A)	5.5%	287	0	287	
	CURRENT WORKING ESTIMATE		5,496	0	5,496	
	Estimated Construction Time	365 Days				

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: DPEC06

3-567

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: DRENNAN PARK

TIME 13:08:45

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PM	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT	W/TX	** TOTAL DIRECT *	* SUBCON *	W/OH&P	SUBTOTAL
										AMOUNT	PCT		
AA	GENERAL/PRIME		1.00	EA	44	1,317	130	2,461		3,908	100.0%	0	3,908
	TOTAL DIRECT				44	1,317	130	2,461		3,908	100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: DPEC06

3-568

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: DRENNAN PARK

TIME 13:08:45

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PM	SUBTOTAL	*** OVERHEAD ***	AMOUNT	PCT	HOFC%	**** PROFIT ****	AMOUNT	PCT	BOND%	OTHR%	***** TOTAL CONTRACT *****	AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		3,908		391	10.0%	0.0		322	7.5%	2.5%	0.0%		4,736	100.0%	4736.30
	TOTAL OVERHEAD & PROFIT				391	10.0%			322	7.5%						

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: DPEC06

3-569

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: DRENNAN PARK

TIME 13:08:45

I DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	44	1,317	130	2,344	117	3,908
TOTAL DIRECT	44	1,317	130	2,344	117	3,908

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: DPEC06

3-570

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: DRENNAN PARK

TIME 13:08:45

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	44	1,317	130	2,344	117	3,908
TOTAL DIRECT	44	1,317	130	2,344	117	3,908

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: DPEC06
3-571

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: DRENNAN PARK

TIME 13:08:45

EQUIPMENT SUMMARY

SUMMARY PAGE 8

----- *** BOOK VALUE ***		ADJ FACTOR	ADJUSTD	BOOK OP	-- HRLY	---	UPB	**** TOTAL ****					
EQUIP	DESCRIPTION	LIFE HRS	TL HRLY	OWNRSH	OWNS	OVTM	OWNRSH	EXPENSE	RATE	RATE	HOURS	COST	
EMI20	SMALL TOOLS								1.40	1.40	4	6	
ETR90	LINE TRUCK								19.86	19.86	6	124	

TOTAL PROJECT EQUIPMENT HOURS												10	130

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: DRENNAN PARK

TIME 13:08:45

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	HRLY RATE	-- UPB RATE	**** HOURS	TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	44	1,317
TOTAL PROJECT MANHOURS								44	1,317

*** END OF SUMMARY REPORT ***

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: DPEC06

3-573

FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 6: INDOOR/OUTDOOR LIGHTING EFFICIENCIES TO RECOMMENDED LEVELS

30 SEPTEMBER 1993

PAGE 1 OF 1

MERCURY VAPOR STREET LIGHT REPLACEMENT

AREA: WERNER PARK

ELECTRIC COSTS:

ENERGY CHARGE \$0.0211 PER KWH

FIXTURE USE: 5200 HR/YR

DEMAND CHARGE \$11.78 PER KW

EXISTING MERCURY VAPOR FIXTURES

175 WATT LAMPS

0 FIXTURES @ 210 W/FIXT = 0 WATTS

BASELINE ENERGY CONSUMPTION 0 KWH

400 WATT LAMPS

17 FIXTURES @ 454 W/FIXT = 7718 WATTS

BASELINE ENERGY CONSUMPTION 40134 KWH

REPLACEMENT HIGH PRESSURE SODIUM FIXTURES

100 WATT LAMPS

0 FIXTURES @ 130 W/FIXT = 0 WATTS

REPLACEMENT ENERGY CONSUMPTION 0 KWH

100 WATT LAMPS

17 FIXTURES @ 130 W/FIXT = 2210 WATTS

REPLACEMENT ENERGY CONSUMPTION 11492 KWH

NET BASELINE ENERGY CONSUMPTION 136.94 MBTU/YR NET RPLCMT ENERGY CONSUMPTION 39.21 MBTU/YR

NET ENERGY SAVINGS 97.73 MBTU/YR NET DOLLAR SAVINGS \$670.37

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 13:36:29

TITLE PAGE

ENERGY SAVINGS OPPORTUNITY SURVY
FT CAMPBELL, KY
ECO-6: WERNER PARK

Contract No: 27-93-C-0096

Prepared By: Systems Corp
Estimator: Keith A. Derrington
Estimate Prep. Date: 08/31/93
Current UPB/CSI ID: ORL290

M - C A C E S E D I T I O N
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Release 4.20

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: WPEC06

3-575

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: WERNER PARK

TIME 13:36:29

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CONTRACTOR INDIRECT SUMMARY.....	5
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SYSTEMS SUMMARY.....	7
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DETAILED ESTIMATE	DETAIL PAGE
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AA. ELECTRICAL.....	1

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Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: WERNER PARK
1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 13:36:29

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL	QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16500 LIGHTING									
16524 3000 HIGH PRESSURE SODIUM									
CD=4 EL 3101 FIXTURE 402C 100 WATT	***	UNIT COSTS: ***		2.73	82.31	8.11	146.48	7.32	244.23
WC=1100	17.00	EA	EELEK	46	1,399	138	2,490	125	4,152
TOTAL DIVISION 16 ELECTRICAL				46	1,399	138	2,490	125	4,152
TOTAL FACILITY AA. ELECTRICAL				46	1,399	138	2,490	125	4,152
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE				46	1,399	138	2,490	125	4,152
TOTAL BASE BID				46	1,399	138	2,490	125	4,152
TOTAL ADDITIVE				0	0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY				46	1,399	138	2,490	125	4,152

* * * END OF DETAIL REPORT * * *

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: WPEC06

3-577

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: WERNER PARK

TIME 13:36:29

PROJECT NOTES

SUMMARY PAGE 1

PROJECT NOTES

ECO-6: STREET LIGHTS

SCOPE OF WORK: EVALUATE USE OF HIGHER EFFICIENCY STREET LIGHTING IN SELECTED
FAMILY HOUSING AREAS.

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: WPEC06

3-578

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
 ECO-6: WERNER PARK

TIME 13:36:29

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY		COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHR FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL	1.00 EA	4,152	415	0	343	123	0	5,032	5032.33
BID ITEM TOTAL		1.00 EA	4,152	415	0	343	123	0	5,032	5032.33
TOTAL BASE BID			4,152	415	0	343	123	0	5,032	
TOTAL ADDITIVE			0	0	0	0	0	0	0	
TOTAL INCL ADD			4,152	415	0	343	123	0	5,032	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: WPEC06

3-579

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: WERNER PARK

TIME 13:36:29

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY	UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00	EA	5,032		5,032	5032.30
TOTAL CURRENT CONTRACT COST				5,032	0	5,032	
Cost Growth from 08/93 to 08/94 Index Values: 0000 0000		0.0%		0	0	0	
ESCALATED CONTRACT COST				5,032	0	5,032	
Government-Furnished Property				0		0	
SUBTOTAL				5,032	0	5,032	
Contingencies		10.0%		503	0	503	
SUBTOTAL				5,536	0	5,536	
SIOH (S&A)		5.5%		304	0	304	
CURRENT WORKING ESTIMATE				5,840	0	5,840	

Estimated Construction Time 365 Days

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: WPEC06

3-580

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: WERNER PARK

TIME 13:36:29

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PM	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT W/TX	** TOTAL DIRECT * AMOUNT PCT	* SUBCON * W/OH&P	SUBTOTAL
AA	GENERAL/PRIME		1.00	EA	46	1,399	138	2,615	4,152 100.0%	0	4,152
	TOTAL DIRECT				46	1,399	138	2,615	4,152 100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: WPEC06
3-581

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: WERNER PARK

TIME 13:36:29

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PH	SUBTOTAL	*** OVERHEAD *** AMOUNT PCT	HOFC%	**** PROFIT **** AMOUNT PCT	BOND% OTHR%	***** TOTAL CONTRACT ***** AMOUNT PCT	UNIT COST
AA	GENERAL/PRIME		4,152	415 10.0%	0.0	343 7.5%	2.5% 0.0%	5,032 100.0%	5032.32
	TOTAL OVERHEAD & PROFIT			415 10.0%		343 7.5%			

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: WPEC06
3-582

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: WERNER PARK

TIME 13:36:29

CSI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	46	1,399	138	2,490	125	4,152
TOTAL DIRECT	46	1,399	138	2,490	125	4,152

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: WPEC06
3-583

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: WERNER PARK

TIME 13:36:29

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	46	1,399	138	2,490	125	4,152
TOTAL DIRECT	46	1,399	138	2,490	125	4,152

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: WPEC06
3-584

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: WERNER PARK

TIME 13:36:29

EQUIPMENT SUMMARY

SUMMARY PAGE 8

----- *** BOOK VALUE ***		ADJ FACTOR		ADJUSTD		BOOK OP --		HRLY ---		UPB		**** TOTAL ****		
EQUIP	DESCRIPTION	LIFE HRS	TL HRLY	OWNRSH	OWNS	OVTM	OWNRSH	EXPENSE	RATE	RATE	HOURS	COST		
EM120	SMALL TOOLS								1.40	1.40	5	6		
ETR90	LINE TRUCK								19.86	19.86	7	132		
											-----	-----		
TOTAL PROJECT EQUIPMENT HOURS												11	138	

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: WPEC06

3-585

Fri 10 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-6: WERNER PARK

TIME 13:36:29

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTH	TKS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	46	1,400
TOTAL PROJECT MANHOURS								46	1,400

* * * END OF SUMMARY REPORT * * *

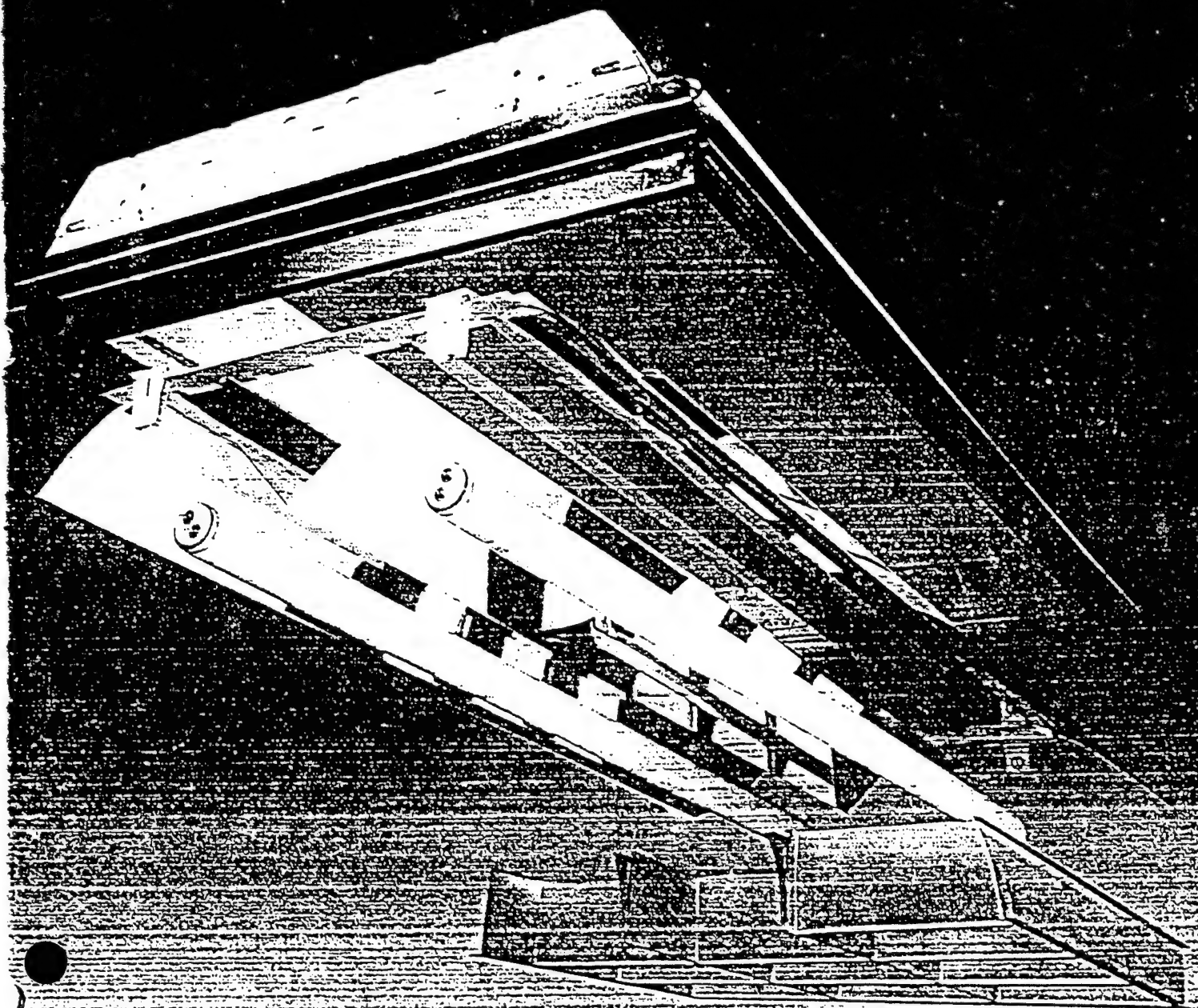
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CURRENCY in DOLLARS

PROJECT ID: WPEC06
3-586

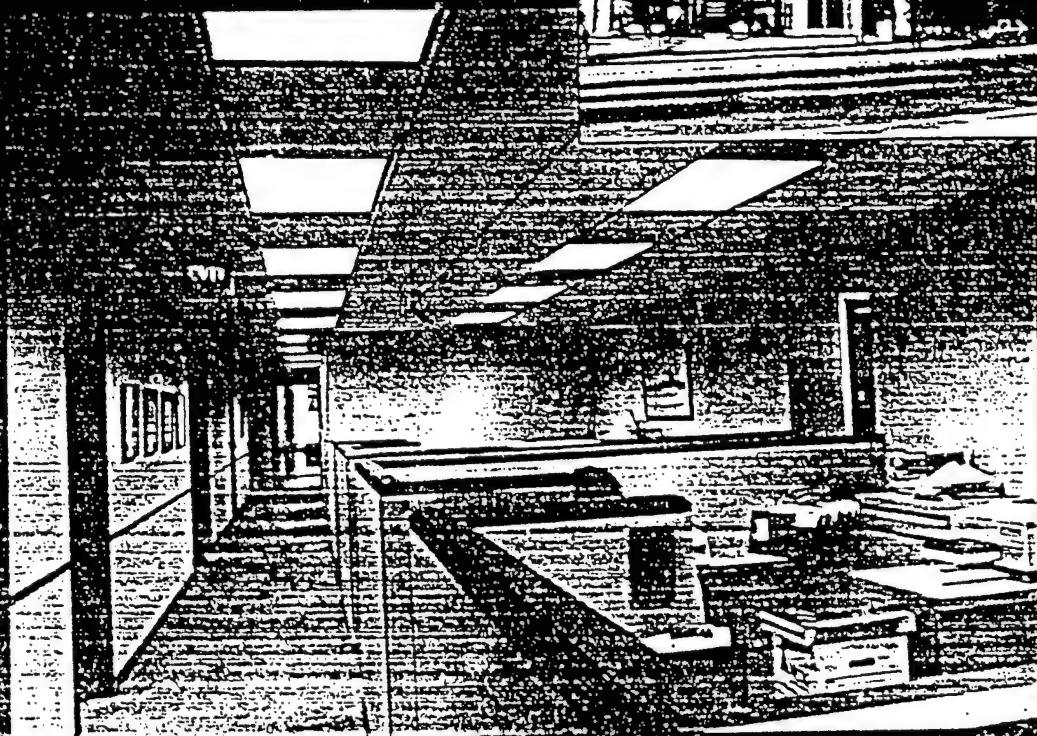


Parke Powerlite 4 Series



With Parke Powerlites, You Can Save Up To 60% Of Your Lighting Costs Each Year!

- Dramatic reduction in energy consumption.
- Operates on .8 - 1.5 watts per square foot.
- Lowers heat load factors enabling HVAC systems to be down-sized.
- Lowers operating costs up to \$1.00 per square foot.
- Increases visual comfort level.



Parke Powerlites incorporate the latest state of the art reflector technology with the best lamp, ballast, lens and louver combinations to produce maximum efficiency and an excellent return on investment.

Model #PP4242ESDC1281

#7548 - PARKE POWERLITE 4 SERIES -
RECESSED 2X4 LUMINAIRE, MODEL
#P4242ESDC12B1 SILVER REFLECTOR, (1)
F40T12/WV LAMPS, (1) ADVANCE R - 25' -
BALLAST, 12 - CELL SEMI - SPECULAR 3"
DEEP LAMPEX, LUMEN RATING = 3700.

- Code gauge steel
- 6" deep trough
- 3" 12 - cell wind - specular parabolic tower
- Energy saver ballast
- (2) F40T12 lamps
- 3 - piece specular silver reflector with tablock
- 2' X 4'

Model #PP4242OEDC12B1

#9635 - PARKE POWERLITE 4 SERIES, RECESSED
2X4 ALUMINAIRE, MODEL #PP424XDCX12R1,
SILVER REFLECTOR. (2) GE F0325P41 32-
WATT T8 LAMPS. (1) TRIAD B3321120 ELEC-
TRONIC BALLAST, 12-CELL, SEMI-SPECULAR
3" DEEP LOUVER, LUMEN RATING = 2950.

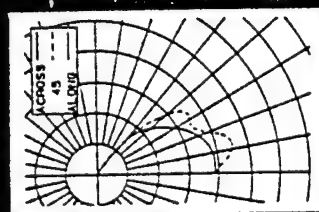
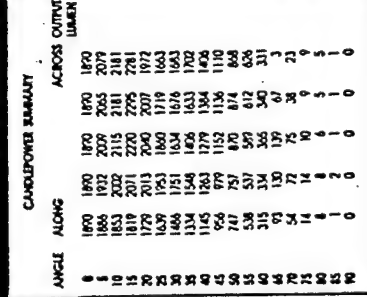
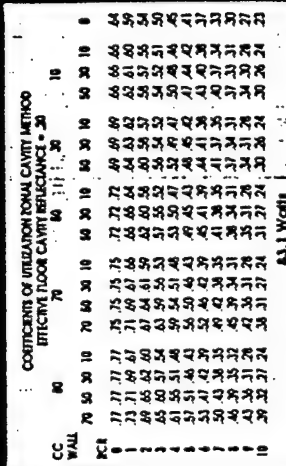
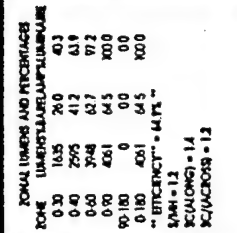
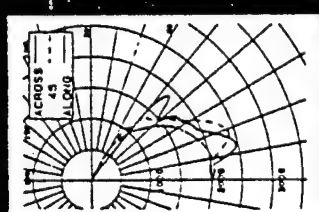
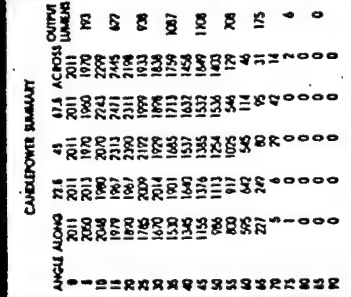
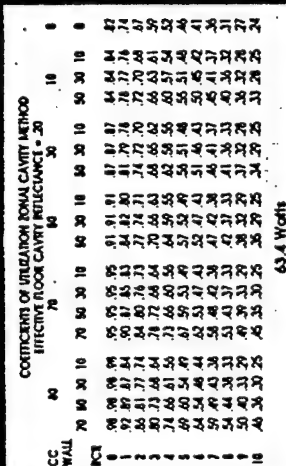
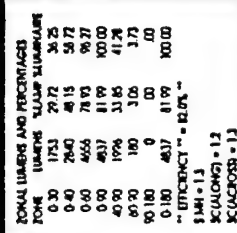
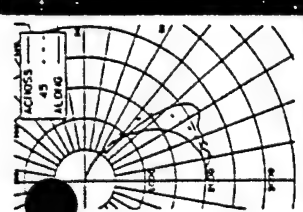
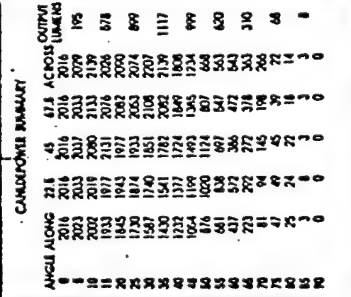
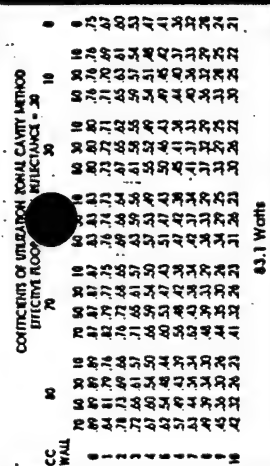
- Code gauge steel
- 3" 12 - cell semi - specular parabolic lower
- Electronic ballast
- (2) T8 lamps
- 3 - piece specular silver reflector w/la tablock fastening
- 2"x4"

Model #PP4222BXDC09B1

#1918A • PARKE POWERLITE 4 SERIES...2X2
LUMINAIRE, MODEL #PP4222BXDC09B1.
SILVER REFLECTOR, (2) GE FO40BXSPX3SR,
1 BALLAST, 9 - CELL SEMI-SPECULAR, 1" DEEP LOUVER, LUMEN RATING = 3150.

- Code gauge steel
- 3" 9 - cell bend - specular lower
- Blax magnetic ballast
- (2) F 40 BX lamps
- 3 - piece specular silver reflector with tablock fastening
- 2" X 2"

PABRIKE INDUSTRIES INC.





MOTOROLA
Lighting Inc.



3 LAMPS
INPUT:
120 VOLTS AC 60 Hz



MOTOROLA
Lighting Inc.

ELECTRONIC BALLAST RAPID START
MODEL NO. M3-FN-T12-1LL-120
FOR SERVICE 1-800-MIL-3089
BUFFALO GROVE, IL 60089

NO PCB'S

DISCONNECT POWER WHEN SERVICING

WIRE TIGHTEN
CONNECT

WHITE
BLACK

LINE
BALLAST

LAMP

RED
YELLOW

LAMP



MOTOROLA
Lighting Inc.

ELECTRONIC BALLAST RAPID START
MODEL NO. M4-FN-T8-1LL-277
FOR SERVICE 1-800-MIL-3089
BUFFALO GROVE, IL 60089

NO PCB'S

DISCONNECT POWER WHEN SERVICING

WIRE TIGHTEN
CONNECT

WHITE
BLACK

LINE
BALLAST

LAMP

RED
YELLOW

LAMP

LAMP

LAMP

LAMP

LAMP

LAMP

LAMP

LAMP

LAMP

LAMP

LAMP

LAMP

LAMP

LAMP

LAMP

LAMP

**HIGH PERFORMANCE
ELECTRONIC BALLASTS**

**FLUORESCENT 1, 2, 3 and 4 LAMP
RAPID START**



MOTOROLA

Lighting Inc.

Total Customer Satisfaction

CUSTOMER SUPPORT 1-800-MLI-0089

HIGH PERFORMANCE FEATURES

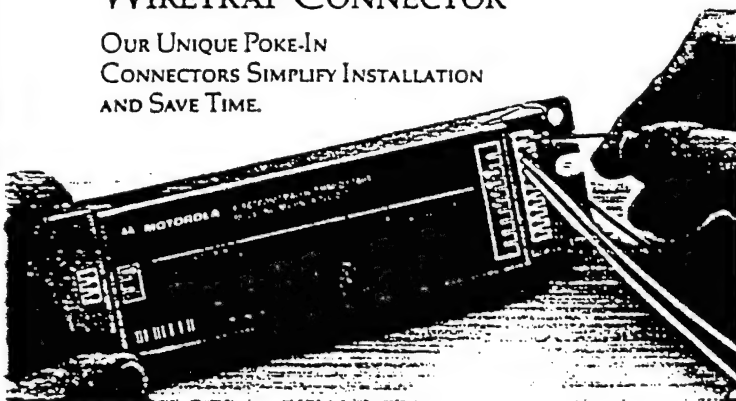
Power Factor:	Greater than .99
Total Harmonic Distortion:	Less than 10%
Third Harmonic Distortion:	Less than 6%
Lamp Current Crest Factor:	Less than 1.5
Lamp Current Frequency:	Greater than 25 KHz
Lamp Configuration:	Series
Lamp Flicker:	Less than 2%, Not Visible
Sound Rating:	Class A
Projected Life:	20 years plus
Connector:	Poke-in wire trap for 18 gauge (solid wire)
Weight:	1.2 lbs.
EMI:	Meets FCC Part 18, Subpart C

CODES

UL Listed:	Class P
Transient Protection:	Meets ANSI C62.41, Cat. A (Formerly IEEE 587)

WIRETRAP CONNECTOR

OUR UNIQUE POKE-IN
CONNECTORS SIMPLIFY INSTALLATION
AND SAVE TIME.



PART NUMBER DESCRIPTION

MODEL NUMBER EXPLANATION					
M	4	R	N	T8	ILL 277
Motorola Lighting Inc.	Electronic Ballast	Number of Lamps Operated	Light Output	Light Level	Full Light Output
<p>Motorola Lighting Inc. Electronic Ballast</p> <p>Number of Lamps Operated: 4</p> <p>Light Output: 120</p> <p>Light Level: 120</p> <p>Full Light Output: 120</p>					

QUALITY

Motorola's goal of acceptable quality is at Six Sigma or no more than 3.4 defects per million opportunities. Motorola Lighting Inc. designed its electronic ballast to meet the most rigorous performance standards at world class levels. This translates into a highly robust product that goes through extensive environmental stress testing to assure our customers of very low initial defect levels (less than 0.1%) and high reliability (greater than 500,000 hours Mean Time to Failure—MTTF).

The economic ballast life is 20 years when operated at 45°C ambient temperature. Operation of MLI's ballast at 50°C may derate life expectancy by 25%.

Six Sigma Quality means "world class" in all that we do at Motorola Lighting Inc., which is part of our commitment to TOTAL CUSTOMER SATISFACTION.



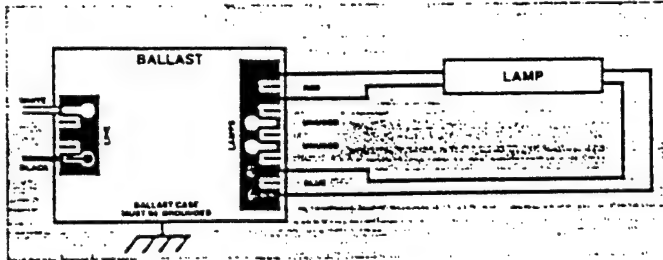
RAPID START BALLASTS

Lamp Type	Rated Lamp Wattage (W)	Lamp Length (FT)	Model No.	Line Voltage (V)	Max Line Current (A)	Typical Line Current (A)	Typical Input Power (W)		Min. Starting Temp (F)
							Open	Enclosed	
1 LAMP T8									
F32T8	32	4	M1-RN-T8-1LL-120	120	.31	.24	29	28	50°
F32T8	32	4	M1-RN-T8-1LL-277	277	.13	.11	29	28	50°
F25T8	25	3	M1-RN-T8-1LL-120	120	.24	.19	23	22	50°
F25T8	25	3	M1-RN-T8-1LL-277	277	.10	.08	23	22	50°
F17T8	17	2	M1-RN-T8-1LL-120	120	.17	.13	16	15	50°
F17T8	17	2	M1-RN-T8-1LL-277	277	.07	.08	16	15	50°
2 LAMP T8									
F32T8	32	4	M2-RN-T8-1LL-120	120	.55	.51	81	58	50°
F32T8	32	4	M2-RN-T8-1LL-277	277	.24	.21	59	56	50°
F25T8	25	3	M2-RN-T8-1LL-120	120	.42	.40	48	45	50°
F25T8	25	3	M2-RN-T8-1LL-277	277	.18	.17	46	44	50°
F17T8	17	2	M2-RN-T8-1LL-120	120	.27	.24	32	29	50°
F17T8	17	2	M2-RN-T8-1LL-277	277	.12	.10	34	31	50°
2 LAMP T12									
F40T12	40	4	M2-RN-T12-1LL-120	120	.64	.59	71	69	50°
F40T12	40	4	M2-RN-T12-1LL-277	277	.27	.25	69	67	50°
F40T12	34	4	M2-RN-T12-1LL-120	120	.54	.50	60	59	60°
F40T12	34	4	M2-RN-T12-1LL-277	277	.23	.21	58	57	60°
F40T10	40	4	M2-RN-T12-1LL-120	120	.64	.60	72	71	50°
F40T10	40	4	M2-RN-T12-1LL-277	277	.27	.25	70	69	50°
F30T12	30	3	M2-RN-T12-1LL-120	120	.48	.44	53	52	50°
F30T12	30	3	M2-RN-T12-1LL-277	277	.21	.19	52	50	50°
F30T12	25	3	M2-RN-T12-1LL-120	120	.40	.37	44	43	60°
F30T12	25	3	M2-RN-T12-1LL-277	277	.17	.16	43	42	60°
3 LAMP T8									
F32T8	32	4	M3-RN-T8-1LL-120	120	.78	.76	90	87	50°
F32T8	32	4	M3-RN-T8-1LL-277	277	.33	.32	89	85	50°
F25T8	25	3	M3-RN-T8-1LL-120	120	.61	.59	70	67	50°
F25T8	25	3	M3-RN-T8-1LL-277	277	.26	.25	69	66	50°
F17T8	17	2	M3-RN-T8-1LL-120	120	.39	.35	47	44	50°
F17T8	17	2	M3-RN-T8-1LL-277	277	.16	.14	44	41	50°
3 LAMP T12									
F40T12	40	4	M3-RN-T12-1LL-120	120	.92	.90	107	105	50°
F40T12	40	4	M3-RN-T12-1LL-277	277	.45	.38	105	103	50°
F40T12	34	4	M3-RN-T12-1LL-120	120	.84	.77	91	89	60°
F40T12	34	4	M3-RN-T12-1LL-277	277	.41	.33	90	88	60°
F40T10	40	4	M3-RN-T12-1LL-120	120	.99	.92	109	107	50°
F40T10	40	4	M3-RN-T12-1LL-277	277	.48	.39	107	105	50°
F30T12	30	3	M3-RN-T12-1LL-120	120	.76	.67	80	78	50°
F30T12	30	3	M3-RN-T12-1LL-277	277	.37	.29	78	76	50°
F30T12	25	3	M3-RN-T12-1LL-120	120	.71	.57	67	65	60°
F30T12	25	3	M3-RN-T12-1LL-277	277	.35	.24	66	64	60°
4 LAMP T8									
F32T8	32	4	M4-RN-T8-1LL-120	120	1.04	1.02	121	118	50°
F32T8	32	4	M4-RN-T8-1LL-277	277	.44	.43	118	115	50°
F25T8	25	3	M4-RN-T8-1LL-120	120	.81	.80	95	91	50°
F25T8	25	3	M4-RN-T8-1LL-277	277	.35	.34	93	90	50°
F17T8	17	2	M4-RN-T8-1LL-120	120	.55	.49	67	64	50°
F17T8	17	2	M4-RN-T8-1LL-277	277	.22	.19	61	58	50°

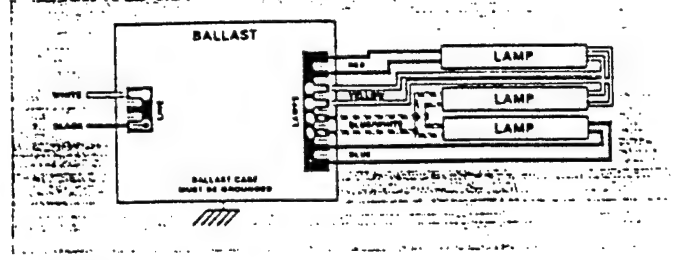
Ballast Will Operate the U-Shaped Equivalents of the Above Lamps. Test Data from Independent Test Lab Available on Request from Factory.

WIRING DIAGRAMS AND BALLAST DIMENSIONS

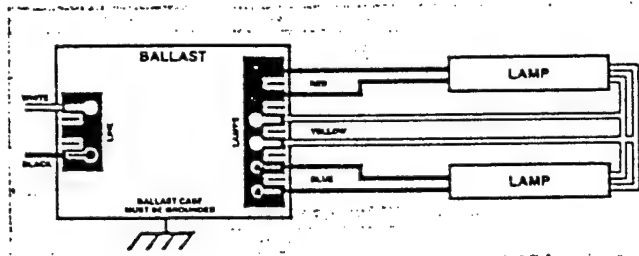
WIRING DIAGRAMS



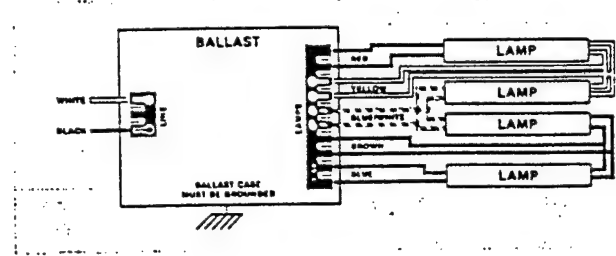
1 LAMP



3 LAMP

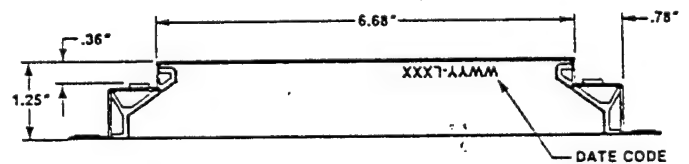
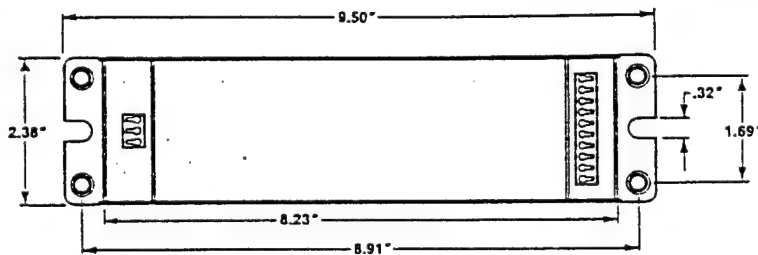


2 LAMP



4 LAMP

BALLAST DIMENSIONS*



*BALLAST IS SYMMETRICAL FOR MOUNTING PURPOSES



Our state-of-the-art manufacturing facility in Buffalo Grove, Illinois—in the U.S.A.

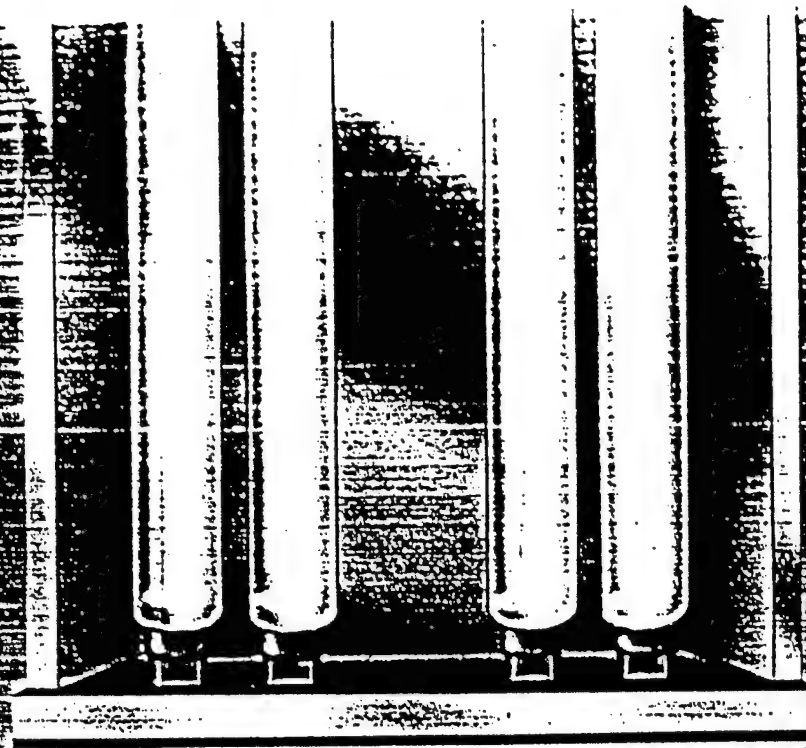


MOTOROLA
Lighting Inc.

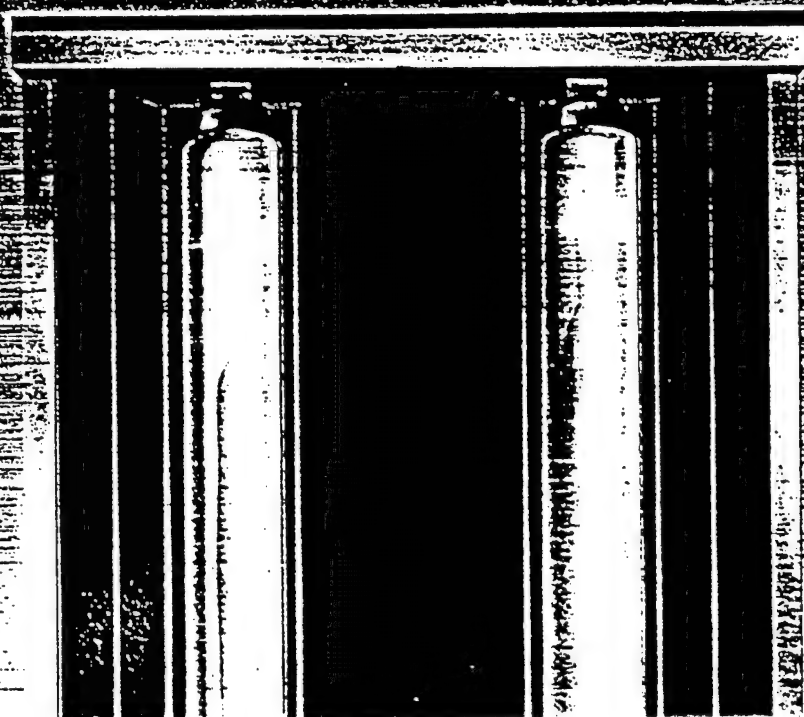
887 Deerfield Parkway
Buffalo Grove, IL 60089
1-800-MLI-0089

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SILVERLUXTM
REFLECTORS
CUT YOUR
LIGHTING ENERGY
COSTS IN HALF.

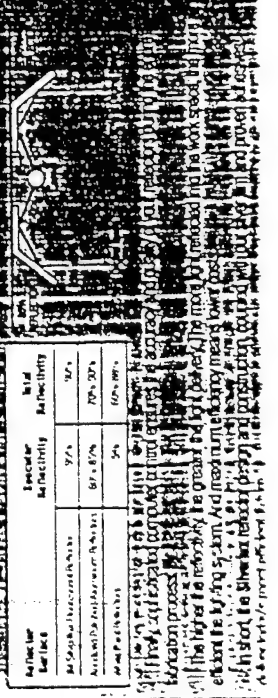


NOT YOUR LIFTING LEVELS.

The money being collected is being used to help pay for the cost of the program. The money being collected is being used to help pay for the cost of the program. The money being collected is being used to help pay for the cost of the program.

2000 hours per year (10 hours/week) 7 days/week	Payroll table		2000 hours per year (10 hours/week) 7 days/week	2000 hours per year (10 hours/week) 7 days/week	Rebate table		2000 hours per year (10 hours/week) 7 days/week	2000 hours per year (10 hours/week) 7 days/week
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98	4	9	98	4	9	98	4	9
99	4	9	99	4	9	99	4	9
100	4	9	100	4	9	100	4	9

the fact that the *Phragmites* in the marshes of the Sacramento-San Joaquin River Delta are being replaced by *Salicornia* and *Suaeda* is a clear indication of the impact of salt water intrusion. The *Phragmites* are being replaced by the *Salicornia* and *Suaeda* because they are more salt-tolerant. The *Phragmites* are being replaced by the *Salicornia* and *Suaeda* because they are more salt-tolerant. The *Phragmites* are being replaced by the *Salicornia* and *Suaeda* because they are more salt-tolerant.



SILVERLUX FLUORESCENT REFLECTORS

- Cut energy costs in half or enhance lighting levels
- Pay for themselves in two years or less
- Install and maintain easily
- Warranted for 5 years
- Attractive low-rate financing available
- Available from nationwide dealer network

For more information just call.

3M is a part of the Green Lights Program—a voluntary, non-regulatory program organized by the Environmental Protection Agency (EPA). This program encourages corporations to take advantage of new lighting technologies and design principles that benefit the environment. 3M is a unique member of the program because it participates as both a consumer of electrical lighting energy and as a developer of electrical lighting products. Silverlux reflectors demonstrate 3M's commitment to energy-efficient lighting technologies that reduce energy consumption and pollution while delivering the same or better lighting.

Cut costs, not lighting.

Innovation working for you™

3M Construction Markets

3M Center Bldg. 225-4S-08

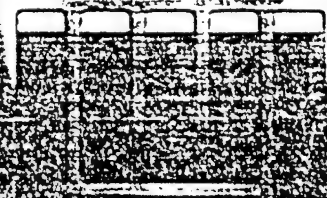
St. Paul, MN 55144-1000

612 733 3333

3M

3-506

ENERGY EFFICIENCY IN LIGHTING



**LIGHTWAY
INDUSTRIES**

CEILINGWAY Low Profile

A classic ceiling fixture with clean, angular lines designed to blend in with a wide variety of architectural styles. The high light output and close profile make it an excellent choice for bathrooms, kitchens and corridors.

OPTIONS AVAILABLE

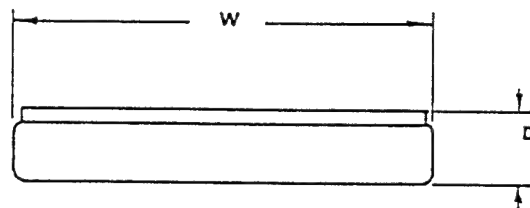
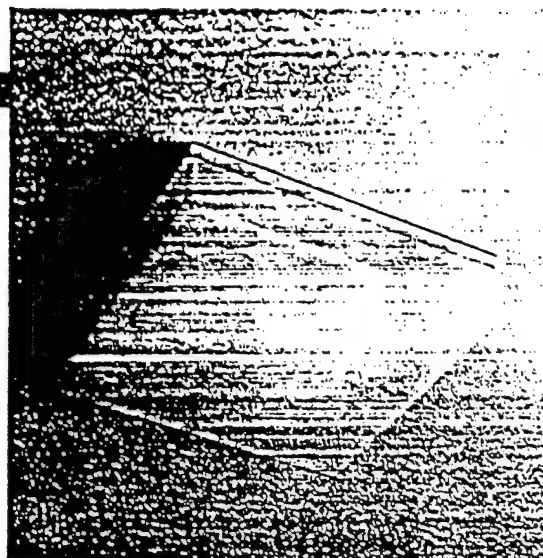
- Cold weather or 277v ballast
- Rapid start ballast for 22 watt
- White polycarbonate diffuser
- Black trim
- Custom color finish
- Emergency Ballast - extended pan req'd
- Tamper proof screws (tool available)



STANDARD FEATURES

- **Construction** Heavy gauge steel
- **Pan** White polyester powder coated
- **Diffuser** White, non-yellowing acrylic
- **Ballast** Rapid start on 32 & 54 watt
- **UL Listed** Damp location
- Mounting hardware & lamp(s)

MODEL	LAMP	W	D	L
CS13LP	13 watt	14"	3 1/4"	14"
CS26LP	2-13 watt	14"	3 1/4"	14"
CS20LP	20 watt	14"	3 1/4"	14"
CS22LP	22 watt	14"	3 1/4"	14"
CS32LP	32 watt	14"	3 1/4"	14"
CS54LP	22 & 32 watt	14"	3 1/4"	14"



CEILINGWAY Square

An economical square ceiling fixture, designed for both strength and economy. Available with circline or twin tube lamps. Optional clear or white polycarbonate diffuser and tamper proof screws are available.

OPTIONS AVAILABLE

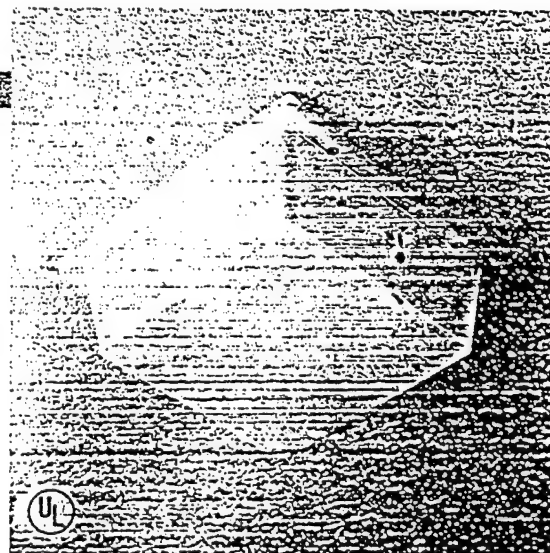
- Cold weather or 277v ballast
- Rapid start ballast for 22 watt
- Clear prismatic acrylic diffuser
- Clear prismatic or white polycarbonate diffuser
- Tamper proof screws (tool available)
- Emergency Ballast - extended pan req'd
- High Pressure Sodium - see new CEILINGWAY HPS/MH on page 19



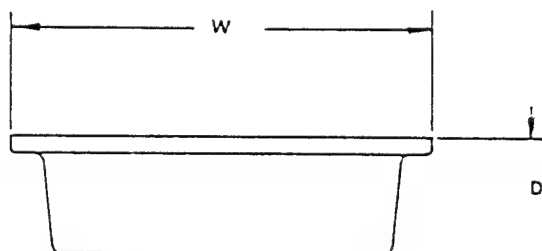
STANDARD FEATURES

- **Construction** Heavy gauge steel
- **Pan** White polyester powder coated
- **Diffuser** White, non-yellowing acrylic
- **UL Listed** Damp location
- Mounting hardware & lamp(s)

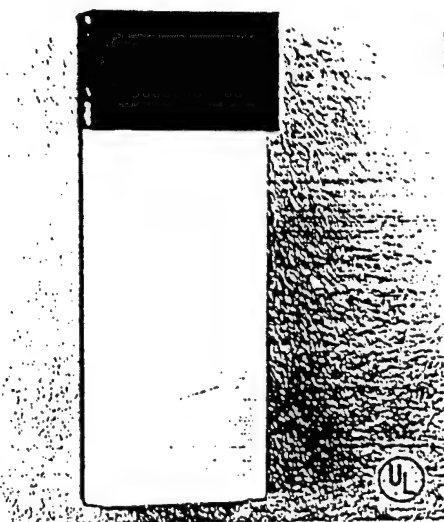
MODEL	LAMP	W	D	L
CS9	9 watt	10 1/2"	4"	10 1/2"
CS13	13 watt	10 1/2"	4"	10 1/2"
CS18	2-9 watt	10 1/2"	4"	10 1/2"
CS26	2-13 watt	10 1/2"	4"	10 1/2"
CS20	20 watt	10 1/2"	4"	10 1/2"
CS22	22 watt	10 1/2"	4"	10 1/2"



Note: To convert existing fixture to fluorescent see CWS retrofit, page 27



SLIMWAY



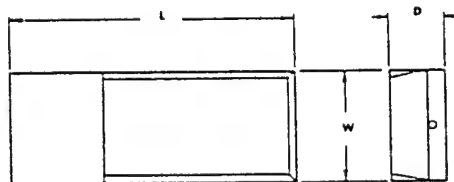
A sleek, compact fluorescent wall bracket with UL Wet listing, ideal for outdoor as well as indoor applications. New: the SLIMWAY Miniature with a 5 watt fluorescent lamp, ideal for steps, closets and more.

STANDARD FEATURES

- **Construction** Heavy gauge steel
- **Finish** Low gloss black polyester powder coated
- **Diffuser** White UV stabilized textured polycarbonate
- **UL Listed** Wet location
- Mounting hardware & Lamp(s)

OPTIONS AVAILABLE

- Clear textured polycarbonate diffuser
- Cold weather or 277v ballast
- Custom color exterior finish
- Tamper proof screw (tool available)
- Back box with knock-outs
- Photo cell - see SLIMWAY Photo cell

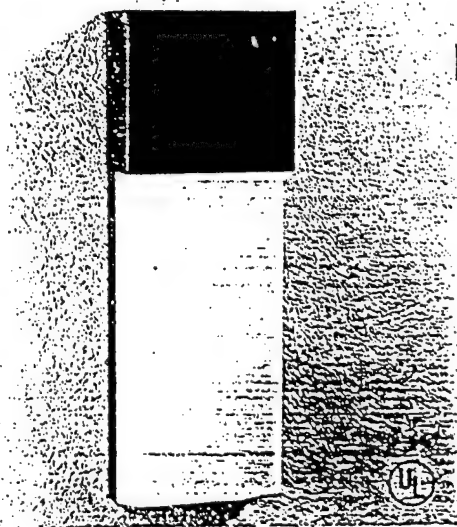


MODEL	LAMP	W	D	L
SW7	7 watt	4"	2"	10 1/2"
SW9	9 watt	4"	2"	10 1/2"
SW13	13 watt	4"	2"	10 1/2"
SW18	2-9 watt	4"	2"	10 1/2"
SWMS	5 watt	4"	2"	6 1/2"



New!

SLIMWAY Photo Cell



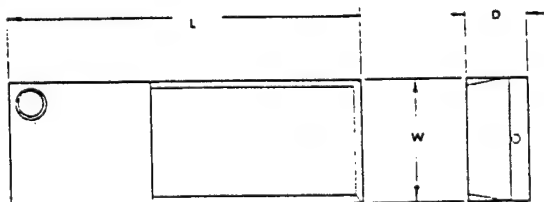
Our very popular SLIMWAY with a built-in "Dusk to Dawn" photo cell. The same quality construction and finish in a slightly taller size. Standard lens is white polycarbonate, but can be ordered with optional clear polycarbonate lens.

STANDARD FEATURES

- **Construction** Heavy gauge steel
- **Finish** Low gloss black polyester powder coated
- **Diffuser** White UV stabilized textured polycarbonate
- **UL Listed** Wet location
- Mounting hardware & Lamp(s)

OPTIONS AVAILABLE

- Clear textured polycarbonate diffuser
- Cold weather or 277v ballast
- Custom color exterior finish
- Tamper proof screw (tool available)
- Back box with knock-outs



MODEL	LAMP	W	D	L
SWP7	7 watt	4"	2"	11 3/4"
SWP9	9 watt	4"	2"	11 3/4"
SWP13	13 watt	4"	2"	11 3/4"
SWP18	2-9 watt	4"	2"	11 3/4"

3-599

SIDEWAY

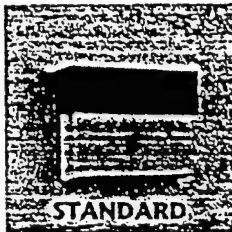
A sister to our SLIMWAY with the same low profile construction, UL Wet Listing and white polycarbonate lens. SIDEWAY is designed for compact fluorescent lighting to 26 watts (2-13 watt). Optional photo cell shown is available.

OPTIONS AVAILABLE

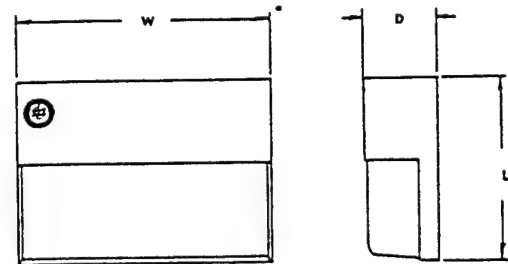
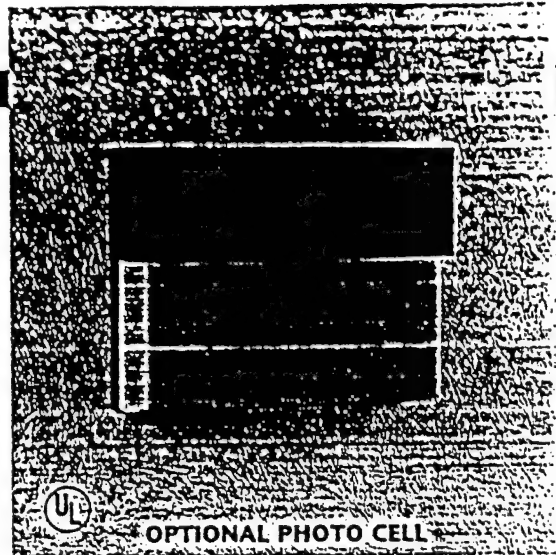
- Clear polycarbonate diffuser
- Cold weather or 277v ballast
- Custom color exterior
- Tamper proof screw (tool available)
- Photo cell

STANDARD FEATURES

- **Construction** Heavy gauge steel
- **Finish** Low gloss black polyester powder coated
- **Diffuser** White UV stabilized textured polycarbonate
- **UL Listed** Wet location
- Mounting hardware & Lamp(s)



MODEL	LAMP	W	D	L
SDW7	7 watt	8 5/8"	2 1/2"	6 11/16"
SDW9	9 watt	8 5/8"	2 1/2"	6 11/16"
SDW13	13 watt	8 5/8"	2 1/2"	6 11/16"
SDW18	2-9 watt	8 5/8"	2 1/2"	6 11/16"
SDW26	2-13 watt	8 5/8"	2 1/2"	6 11/16"



BRIGHTWAY

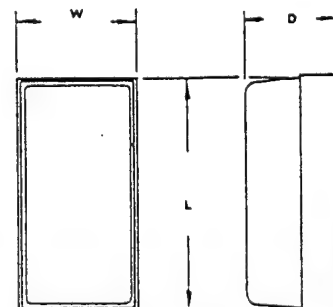
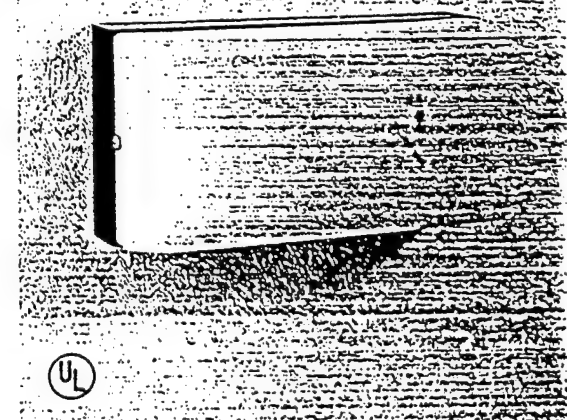
UL Wet Listed for use indoors or out, in wall or ceiling applications. White polycarbonate lens and powder coated steel construction are standard features. Options include Polished Brass finish and Bulkhead style cage.

OPTIONS AVAILABLE

- Clear textured polycarbonate diffuser
- Cold weather or 277v ballast
- Chrome or Polished Brass finish
- 3" letters or numbers (up to 4 digits)
- Bulkhead style cage
- Custom color finish
- Back box with knock-outs or backplate
- Tamper proof screws (tool available)
- Photo cell

STANDARD FEATURES

- **Construction** Heavy gauge steel
- **Finish** Low gloss black polyester powder coated
- **Diffuser** White UV stabilized textured polycarbonate
- **UL Listed** Wet location
- Mounting hardware & Lamp(s)



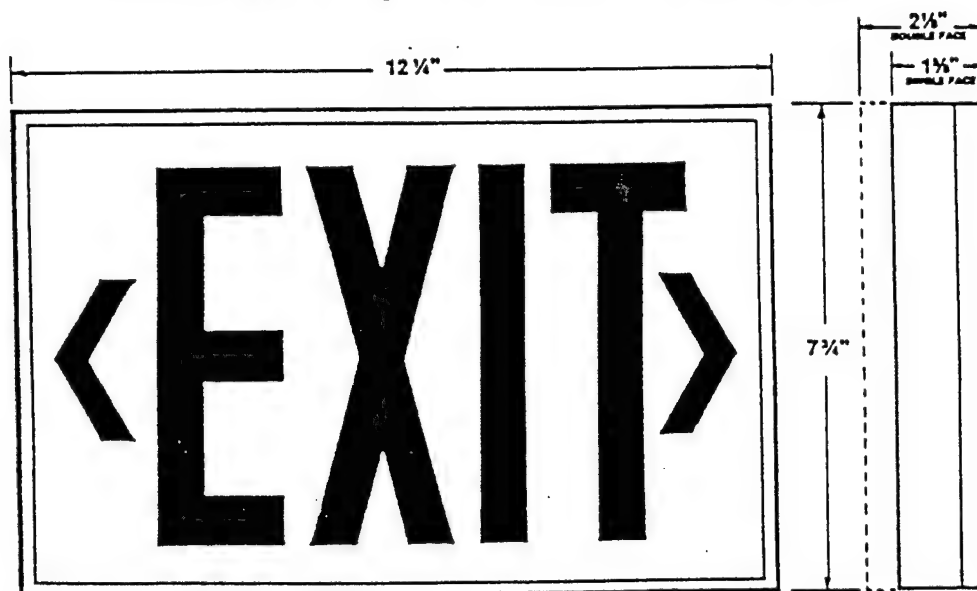
MODEL	LAMP	W	D	L
BW7	7 watt	4 1/2"	3 1/2"	8 9/16"
BW9	9 watt	4 1/2"	3 1/2"	8 9/16"
BW13	13 watt	4 1/2"	3 1/2"	8 9/16"
BW18	2-9 watt	4 1/2"	3 1/2"	8 9/16"
BW26	2-13 watt	4 1/2"	3 1/2"	8 9/16"



Evenlite LED Exit Lights

EV SERIES

The LED of the 21st Century



No Ifs, Ands or Buts.

This is exactly how the EVENLITE 2000 appears! Perfectly even illumination is produced by indirect lighting, so that the LED's are invisible, with no hot spots. All this is provided in the slimmest sign on the market with integral charger and battery.

No competitor comes close to these combined specifications:

- Less than 3 watts total power per face
- Perfect light distribution across face
- Single face only 1 5/8" thick
- Double face only 2 1/8" thick
- Remote unit only 1/2" thick
- Multiple LED lamps with 20 year unconditional guarantee
- NICAD batteries with 5 year guarantee
- Aluminum housing for light weight and strength
- Universal mount
- Baked enamel, vinyl clad or satin anodized finishes
- Polycarbonate faceplate

Patent Pending



SHIELD SOURCE INCORPORATED
220 VFW Avenue, Grasonville, Maryland 21638
Tel.: (410) 827-6022 Fax: (410) 827-9657

3-601



SHIELD SOURCE INCORPORATED

EXIT SIGN COST COMPARISON

MODEL 101 SELF-LUMINOUS SIGN VS ELECTRICAL SIGNS

10 YEAR COSTS:

	AC/DC Battery 2 x PL7 Lamps	AC/DC Battery 2 x 25w Lamps	SHIELD Model 101
Fixture (1)	120	80	
Labor & Material (1)	80	80	15
<u>INITIAL INSTALLED COST:</u>	<u>200</u>	<u>160</u>	
Electricity	123 (2A)	438 (2B)	0
Lamp	144 (3A)	115 (3B)	0
Lamp replacement labor(4)	45	575	0
Battery replacement (5)	220	220	0
Battery maintenance (6)	40	40	0
Cost inflation factor (7)	160	389	0
<u>TOTAL COSTS AFTER 10 YRS:</u>	<u>\$932</u>	<u>\$1,937</u>	<u>\$</u>

TO COMPARE COSTS, INSERT YOUR QUOTE FOR SHIELD SIGNS IN COLUMN 3.

Based on above and assuming SHIELD sign average cost is \$200 installed, if you now have 50 Exit signs operating with 25w lamps over 10 years, and we include the cost of a new SHIELD sign in 1998 at \$256 installed (inflation at 2.5% per yr) YOU COULD SAVE \$96,394! Even with current "power and labor saving" exits with PL7 lamps, savings will be \$46,144!

NOTES:

- (1) Average 1987 Fixture costs: Electrical contractor labor at \$30/hr: Material includes typical pipe, wire, & circuit breaker: If new load center needed, add to material costs.
- (2A) Two 7 watt PL7 lamps/sign, 24 hrs/day at \$0.10/kwh.
- (2B) Two 25w lamps/sign, 24 hrs/day at \$.10/kwh.
- (3A) 10,000 hr lamps, 9 changes of 2 lamps/sign, lamp at \$8.00 ea.
- (3B) 750 hr lamps, 115 changes of 2 lamps/sign, lamp at \$.50 ea.
- (4) Lamp replacement, 15 min/sign, labor \$10.00/hr.
- (5) Battery costs estimated for a change every 2½ years per sign or 4 changes at a cost of \$55.00/unit. The cost per battery will vary as to type of battery installed. This estimate also assumes no failure of charger or transfer circuits.
- (6) Battery maintenance and replacement per (7) above, 4 changes per sign, 1 hr/sign, labor at \$10.00/hr.
- (7) Inflation 2.5% per year applied to operating and maintenance costs for electric signs after installation.

UNENCO®

Designers and Manufacturers of Reliable, Common Sense, Energy Conservation Equipment

1993 PRICE LIST

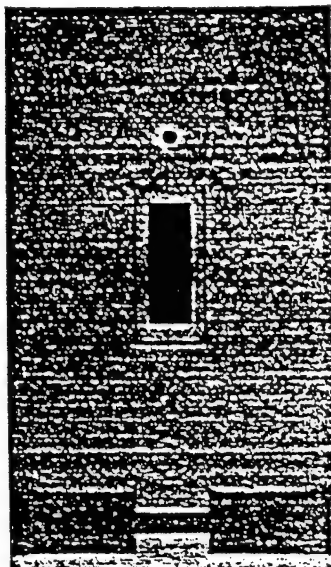
January 1993

Supersedes all previous price lists.

Prices subject to change without notice.

The Most Specified Occupancy Sensor In The Industry

The Only Automatic Light Switch That Looks Like a...



Switch to Everyone!

The model SOM-500-A **Switchomat** can save \$60 per year in a typical office; \$30,000 a year in a 100,000 sq. ft. facility, and is the most specified automatic lighting control in the industry. With its unique, sensitive high density pattern and 20-year, trouble-free life expectancy, the SOM-500-A **Switchomat** is the world's best investment in energy conservation. All UNENCO sensors work with new and existing lighting technologies. And, along with the UNENCO free layout and design service, as with all our products, we offer a 90-day money-back guarantee and up to 5 years warranty.

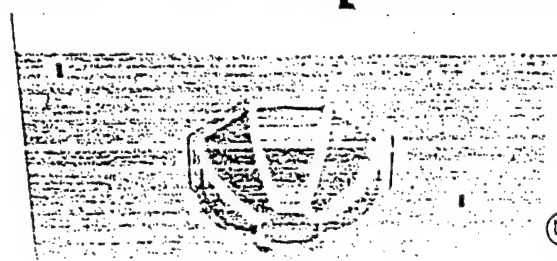
Evaluation Price: \$52.00



Look for the UNENCO lightning bolt for innovative designs and new products!

UNENCO'S NEW and EXCLUSIVE "QUIK-TO-INSTALL"

Tailored  to the needs of the Professional Installer!



PIR-1000-QTI

The "**QUIK-TO-INSTALL**" (QTI) is the new industry standard.

With **color-coded**, low voltage connectors and **standard** plenum harness cable lengths the QTI is fast and easy to assemble! The PIR-1000-QTI occupancy sensor with 360° viewing pattern covers 1,000 square feet. All features of the revolutionary "**QUIK-TO-INSTALL**" are designed to reduce material and labor costs and deliver 100 years of trouble-free performance. Compatible with new and existing lighting technologies.

Evaluation Price: \$74.50
(for complete QTI system)

Risk Free Offer

Take advantage of our UNENCO Equipment Evaluation Period policy. Order any of the products on this page and try them for 30 days, risk free! If you are not fully satisfied with their performance, send them back to us within 30 days and pay nothing. UNENCO offers a 90 day money-back guarantee and up to 5 years warranty on all our products. UNENCO has a proven history of quality products, service and performance since 1983.

UNENCO, Inc.
Corporate Headquarters
2555 Nicholson Street
San Leandro, CA 94577-4216
510-352-1802 • FAX: 510-895-5753 • 1-800-227-0452

Texas Office:
208-B Industrial Court
P. O. Box 416
Wylie, TX 75098-0416
214-442-5493 • FAX: 214-442-4198 • 1-800-527-7406



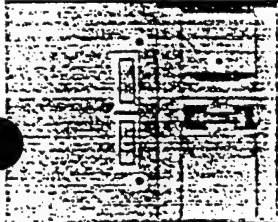
3-603

January 1993

Supersedes all previous price lists

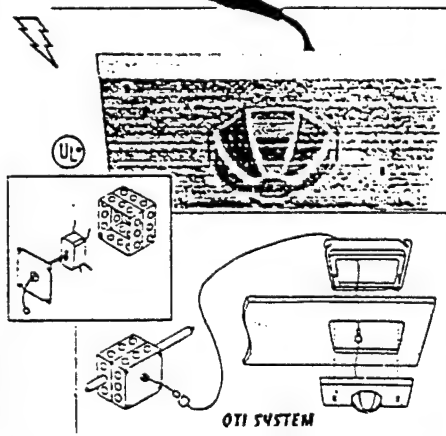
Prices subject to change without notice

LIST
PRICE1-23
UNITS24-95
UNITS96 UNITS
and Up.**Automatic Wall Light Switches *Switchomat*™ Passive Infrared**

	SOM-500-A UL	SOM-500-A Switchomat ™ Manual lights off switch with built-in safety neon night light. Occupancy sensor, up to 800 sq. ft. coverage. 120/277 Volt, 1000/1800 Watt switching capacity, fluorescent or incandescent. Immediate activation when entering room.	\$78.00	\$60.00	\$56.00	\$52.00
	SOM-1000-A SOM-1000-B UL	SOM-1000-A Switchomat ™ Occupancy Sensor, up to 1000 sq. ft. coverage. 120/277 Volt, 1000/1800 Watt switching capacity, fluorescent or incandescent, 180° coverage. Immediate activation when entering room.	84.00	64.00	60.00	56.00
	SOM-1000-A-2 UL	SOM-1000-B Switchomat ™ Occupancy Sensor, up to 1000 sq. ft. coverage. Single circuit heavy load capacity. Min. 900 Watt to max. 2400 Watt at 120V ballast rating. Min. 1800 Watt to max. 4500 Watt at 277V ballast rating, 180° coverage. Immediate activation when entering room.	97.50	73.00	69.00	65.00
		SOM-1000-A-2 Switchomat ™ 2 switches, 2 circuits, occupancy sensor, up to 1000 sq. ft. coverage. 120/277 Volt, 1000/1800 Watt switching capacity on each circuit (2 wires) 180° coverage. Immediate activation when entering room.	93.00	70.00	66.00	62.00
	UL	SOM-1200-2-HD Switchomat ™ Tailored specifically for classrooms! 2 switches, 2 circuits, immediate activation sensor with up to 4000 sq. ft., 180° coverage. 120/277V, 2000/4000 Watt switching capacity on each circuit (2 wires). Can be mounted in either double or triple gang wall box or plaster ring.	132.00	96.00	92.00	88.00

Ceiling-Mounted Passive Infrared *Conserver*™ Occupancy Sensors

The NEW "Quik-To-Install" (QTI) product line can be ordered separately, in any combination to fit any installation need. The color-coded connectors make assembly of a QTI sensor, QTI Plenum Harness Cables and a QTI Power Pack fast and easy!



PIR-1000-QTI The PIR-1000-QTI, occupancy sensor. Up to 1000 sq. ft. coverage, 360° high density viewing pattern. Color-coded connectors and standard length UL approved plenum harness cable makes installation <i>fast and easy</i> . For use with QTI Power Pack, 20 amp switching capacity. Saves materials and labor!	78.00	60.00	56.00	52.00
PIR-2000-QTI The PIR-2000-QTI, occupancy sensor. Up to 2000 sq. ft. coverage, 360° high density viewing pattern. Color-coded connectors and standard length UL approved plenum harness cable makes installation <i>fast and easy</i> . For use with QTI Power Pack, 20 amp switching capacity. Saves materials and labor!	112.50	85.00	80.00	75.50
PIR-1000-P Conserver ™ Self contained occupancy sensor. Up to 1000 sq. ft. coverage. 360° high density viewing pattern. <i>Specify voltage when ordering.</i>	93.00	68.00	64.00	62.00
PIR-2000-P Conserver ™ Self contained occupancy sensor. Up to 2000 sq. ft. coverage. 360° high density viewing pattern. <i>Specify voltage when ordering.</i>	127.50	95.00	90.00	85.00

Ceiling-Mounted Ultrasonic *Conserver*® Occupancy Sensors

All Ceiling-Mounted occupancy sensors can automatically control the On/Off for lighting and HVAC.



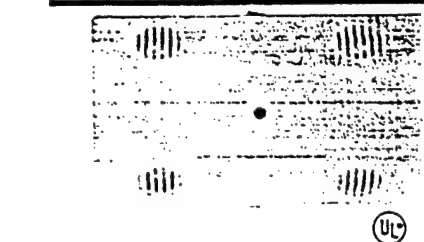
C-500-2000-QTI **\$132.00** \$98.00 \$93.00 \$88.50

Up to 2000 sq. ft. coverage occupancy sensor. Color-coded connectors for easy identification. For use in large open offices. Also suitable for long hallways, 100' x 15'. For use with QTI Power Pack and harness cables.



C-500-1000-QTI **118.00** 88.00 83.00 78.50

Up to 1000 sq. ft. coverage. For use with QTI Power Pack and harness cables.



C-600-R-QTI **91.50** 69.00 65.00 61.50

Conserver
 Up to 600 sq. ft. coverage. Equipped with versatile transmitter power slide switch feature for use in small rooms. For use with QTI Power Pack and harness cables.

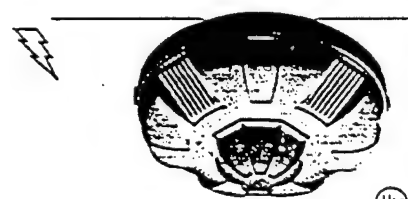
C-500-2000-P **148.50** 109.00 104.00 99.00

Conserver
 Self contained, 2000 sq. ft. coverage sensor for multiple unit installations in large open offices. Also suitable for long hallways, 100' x 15'. *Specify voltage when ordering.*

C-500-1000-P **143.50** 104.00 99.00 94.00

Conserver
 Self contained up to 1000 sq. ft. sensor. *Specify voltage when ordering.*

Combination Ultrasonic and Passive Infrared / Specialty Occupancy Sensors

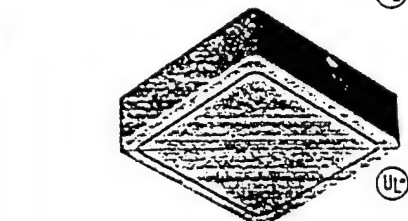


Combo Sensor QTI

"Combo"

Dual technology occupancy sensor combines both ultrasonic and passive infrared for those specifiers who cannot take any chances. Built in light level sensor for additional savings where feasible. For use in large offices where small motion detection is vital.

145.00 112.50 104.50 102.00

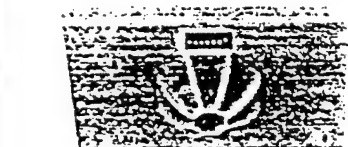


HVAC Control *Conserver*®

HMS-1 **103.50** 78.00 73.00 69.50

HVAC control for offices, Hotel/Motel guest rooms up to 400 sq. ft. with built-in fresh air comfort cycle timer.

Photoelectric Controller Automatic Light Level Controls



DAYLIGHT TRACKER DT **63.00** 50.00 46.00 42.00

Measures ambient daylight levels, then automatically activates lights only when lighting is necessary. Factory calibrated foot candle level settings, adjustable with unique "dip switch". No more guesswork.

Anytime Calibration



DAYLIGHT TRACKER DT-D **63.00** 50.00 46.00 42.00

Measures ambient daylight levels, then automatically dims to preset light levels. To be used with I. C. Controllable Electronic Ballast.

DAYLIGHT TRACKER DT-P **78.00** 60.00 56.00 52.00

Self-contained, measures ambient daylight levels. 20 amp switching capacity. *Specify voltage when ordering.*

3-605

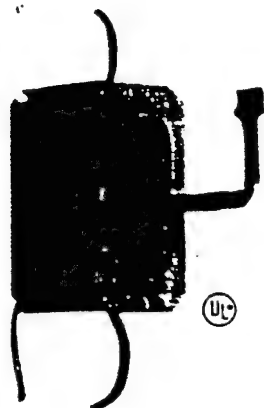
January 1993

Supersedes all previous price lists

Prices subject to change without notice

LIST PRICE	1-23 UNITS	24-95 UNITS	96 UNITS and Up.
---------------	---------------	----------------	---------------------

Power Switch Packs / Accessories



Model 211-QTI

120V Power/Switch Pack with isolated relay contacts and color-coded connectors. 20 AMP ballast rating. 40 year life expectancy at full load. *Heavy duty power packs for motor loads available upon request.*

\$27.75	\$22.00	\$20.00	\$18.50
---------	---------	---------	---------

Model 212-QTI

208/240V Power/Switch Pack with isolated relay contacts and color-coded connectors. 20 AMP ballast rating. 40 year life expectancy at full load. *Heavy duty power packs for motor loads available upon request.*

27.75	22.00	20.00	18.50
-------	-------	-------	-------

Model 213-QTI

277V Power/Switch Pack with isolated relay contacts and color-coded connectors. 20 AMP ballast rating. 40 year life expectancy at full load. *Heavy duty power packs for motor loads available upon request.*

27.75	22.00	20.00	18.50
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QTI 15' Plenum Harness Cable

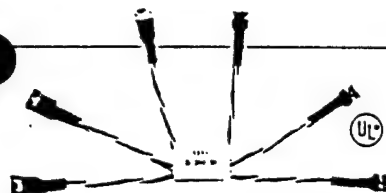
UL approved plenum harness cable with color-coded connectors. Makes a QTI occupancy sensor and QTI Power Pack installation *fast and easy.*

7.00	5.00	4.50	4.00
------	------	------	------

QTI 20' Plenum Harness Cable

UL approved plenum harness cable with color-coded connectors. Makes a QTI occupancy sensor and QTI Power Pack installation *fast and easy.*

7.50	5.50	5.00	4.50
------	------	------	------



QTI Splitter S-3M-3F

Used in conjunction with QTI system for multiple sensor, power pack installations.

7.50	6.00	5.50	5.00
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Double Gang Adapter Plate
Model DGAP-500

DGAP-500

Model SOM-500-A Occupancy Sensor accessory.

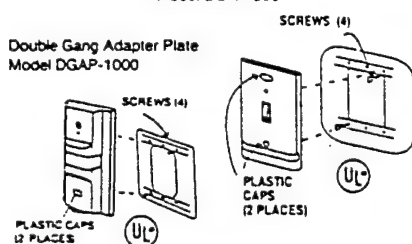
4.15	2.75	2.75	2.75
------	------	------	------

Double Gang Adapter Plate
Model DGAP-1000

DGAP-1000

Model SOM-1000 Occupancy Sensor accessory.

4.15	2.75	2.75	2.75
------	------	------	------



RRU

Remote Relay Unit for switching additional circuits or can be used as interface for HVAC controls since contacts are isolated. For use with self-contained "P" version units. 20 AMP switching capacity, 1 to 1.5 HP, 4 wire connection. *Specify voltage when ordering.*

30.00	24.00	22.00	20.00
-------	-------	-------	-------



TERMS AND CONDITIONS

Payment Terms

2% cash discount if paid 10 days from date of invoice or on any COD shipment. Net 30 days after date of invoice. Sales tax added to California and Texas unless resale number is provided. Minimum order \$100.00. On any order below \$100.00 a \$10.00 service charge for shipping and handling will be added. Prices subject to change without notice. Past due accounts accrue 1.5% charge per month.

Freight

Freight FOB San Leandro, CA, USA.

Hawaii, Puerto Rico and Alaska charges will be added to invoice. Next day delivery UPS red charges will be added to invoice. Second day delivery UPS blue charges will be added to invoice.

3-606

SECTION 4 TABLE OF CONTENTS

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BLDG 3071	ECO 10	4-163
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4 PROGRAMMING DOCUMENT - ECIP PROJECT 2

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BLDG 7262	ECO 10	4-294
BLDG 7264	ECO 10	4-313
BLDG 7268	ECO 10	4-332
BLDG 7272	ECO 10	4-351
CATALOG CUT SHEETS		4-370

4 PROGRAMMING DOCUMENT - ECIP PROJECT 2

The existing dual temperature water pumps in buildings 6942 and 6943, respectively fifteen and ten horsepower, operate at a constant speed for 8760 hours per year. The addition of variable speed drives and two-way control valves will allow the speed of the pumps to be varied, thus varying the system water flow. The two-way control valves will be retrofitted to the fan coil units that are served by the pumps. The throttling action of the two-way control valves at non-peak loads will allow the system to reduce flow without reducing pressure. The water flow will be varied to match the system heating or cooling load. Water in excess of that required to meet the heating or cooling demand will not be pumped.

Currently, the diesel fired generators at the water treatment plant and the Boiling Springs Pump Station are only run during periods of power interruption or to test the generators. During all other periods the treatment plant and pump station operate on power purchased from the utility company. The proposed construction will consist of new controls linking the generators to the Post Energy Management Control System. The new controls will allow for the remote operation of the generators and include start-stop capability. The generators will be used to meet the electric load for the respective plants during periods of the Post's peak electrical demand.

The Energy Management Control System (EMCS) extension and expansion will include adding fifteen buildings to the current Post EMCS. The EMCS will provide for remote monitoring, night setback, and start/stop capability for each piece of equipment that is connected to the system. The project extends and expands the EMCS to fifteen buildings. The buildings are building 80, 2702, 2840, 3069, 3071, 3934, 5380, 6627, 6636, 6921A, 7243, 7262, 7264, 7268, and 7272.

The project will save 1162 MBTU/year of energy and \$143,125. The annual recurring non-energy savings (3B on LCCA) is -\$10,400. The \$10,400 is added maintenance expense due to the increased operation of the generators.

This section contains the programming documentation for ECIP Project 2, peak-shaving generators, variable speed circulation pumps and EMCS expansion. Included are the project development brochures, 1391 forms, life cycle cost analysis, cost estimates for each building, and energy calculations for each building. Catalog cut sheets are included as an appendix to the document (located at the end of this section) to represent the replacement products.

OBJECTIVE:

The objective of this project is to install variable speed drives, expand the Energy Management and Control System (EMCS) and add controls to use existing generators for peak shaving. The improvements will reduce energy consumption and life cycle operating costs for the subject facilities in accordance with the Army Energy Resources Management Plan (ERMP) and Executive Order 12759.

functional requirements summary, PDB-1

4-3

FORT CAMPBELL, KY

CLARKSVILLE BASE
HEADQUARTERS LOOP

TO SPORTSMAN LODGE
ARMY TRAVEL CAMP
PRINTING & FISHING
RIDING STABLES
NATURE CENTER
GARDNER HILLS HOUSING AREA
GATE 10

CLARKSVILLE, TN

Map Property of U.S. Government,
Public Affairs Office, Ft. Campbell

4-4

APPENDIX C
DOCUMENTATION CHECKLIST

A. SPECIAL CONSIDERATIONS

ITEM

A-1	Cost estimates for each primary and supporting facility
A-2	Telecommunications system coordination with USACC and authorization for exceptions
A-3	Coordination with state and local governmental requirements (blind vendors, medical facilities, construction and operating permits, clearinghouse coordination, etc.)
A-4	Assignment of airspace
A-5	Economic analysis of alternatives
A-6	Approval for new starts
A-7	International balance of payments (IBOP) coordination with U.S. European command and NATO—overseas cost estimates and comparables (include rate of exchange used in estimates)
A-8	Impact on historic places—on site survey by authorized archeologist and coordination with state historic preservation officer and advisory council on historic preservation
A-9	Exceptions to established criteria
A-10	Coordination with various staff agencies (Provost Marshall-physical security, etc.)
A-11	Identification of related or support projects (so projects can be coordinated)
A-12	Required completion date

Other Special Considerations (List and number items)

1. See Appendix A

Required or Not Required	To Be Determined	Comment Attached	Document Attached
R	D		1
NR			
R	A		
NR			
R	D		
NR			
NR			
NR			
R			
R			
R			

REQUIRED OR NOT REQUIRED — Not relevant or no information to communicate. Enter "R" if item is relevant and is required for this project. Enter "NR" if item is irrelevant and is not required for this project.

TO BE DETERMINED — Information needed but not currently available. Enter code for information source.

COMMENT ATTACHED — Significant information summarized or explained and attached.

DOCUMENT ATTACHED — Significant information is in an existing document which is attached.

*** BY WHOM** (Check and insert appropriate letter)

A — DFAE

B — Using Service

C — Construction Service

D — Designer

E — Other (Check Comments Attached and explain)

documentation checklist

4-6

B. SITE DEVELOPMENT

ITEM		Required or Not Required	To Be Determined	Comment Attached	Document Attached
B-1	Consultation with the District Office to determine and evaluate flood plain hazards	NR			
B-2	Preparation, submission, and/or approval of new	NR			
(A)	General Site Plan	NR			
(B)	Annotated General Site Plan	NR			
(C)	Sketch Site Plan	NR			
(D)	Facilities Requirements Sketch	R			
B-3	Preparation of	NR			
(A)	Site Survey	NR			
(B)	Subsoil information	NR			
B-4	Approval by Department of Defense Explosive Safety Board (DDESB) for Safety Site Plan	NR			
Other Site Development Considerations (List and number items)					
1. See Project Development Brochure, PDB-1/2					

REQUIRED OR NOT REQUIRED — Not relevant or no information to communicate. Enter "R" if item is relevant and is required for this project. Enter "NR" if item is irrelevant and is not required for this project.

TO BE DETERMINED — Information needed but not currently available. Enter code for information source.

COMMENT ATTACHED — Significant information summarized or explained and attached.

DOCUMENT ATTACHED — Significant information is in an existing document which is attached.

***BY WHOM** (Check and insert appropriate letter)

A — DFAE

B — Using Service

C — Construction Service

D — Designer

E — Other (Check Comments Attached and explain)

documentation checklist

4-7

C. ARCHITECTURAL & STRUCTURAL

ITEM		Required or Not Required	To Be Determined	Comment Attached	Document Attached
C-1	Reconciliation with troop housing programs and requirements	NR			
C-2	Evaluation of existing facilities (including degree of utilization)	R	D		1
C-3	Approval for removal and relocation of existing useable facilities	NR			
C-4	Evaluation of off-post community facilities	NR			
C-5	Storage and maintenance facilities (including nuclear weapons)	NR			
C-6	Coordination hospitals, medical and dental facilities with Surgeon General	NR			
C-7	Coordination of aviation facilities with FAA	NR			
C-8	Coordination air traffic control and navigational aids with USACC	NR			
C-9	Tabulation of types and numbers of aircraft	NR			
C-10	Evaluation of laboratory, research and development, and technical maintenance facilities	NR			
C-11	Coordination chapels with Chief of Chaplains	NR			
C-12	Review food service facilities by USATSA	NR			
C-13	Automated data processing system or equipment approvals—cost analysis when ADP and/or communication centers not co-located with related facilities	NR			
C-14	Coordination postal facilities with U.S. Postal Service Regional Director	NR			
C-15	Laundry and dry cleaning facilities coordination with ASD(I&L)	NR			
C-16	Tenant facilities coordination with Installation where sited	NR			
C-17	Facilities for or exposed to explosions, toxic chemicals, or ammunition—review by DDESB (See also Item B-4)	NR			
C-18	Analysis of deficiencies	R	D		1
C-19	Consideration of alternatives	R	D		2
C-20	Determination whether occupants will include physically handicapped or disabled persons	NR			
C-21	As-built drawings for alterations or additions	R	C		
C-22	Availability of Standard Design or site adaptable designs	NR			
Other Architectural & Structural (List and number items)					
1. See Supplemental Data Detailed Project Justification Paragraph D3.					
2. See Supplemental Data Detailed Project Justification Paragraph D4.					

REQUIRED OR NOT REQUIRED — Not relevant or no information to communicate. Enter "R" if item is relevant and is required for this project. Enter "NR" if item is irrelevant and is not required for this project.

TO BE DETERMINED — Information needed but not currently available. Enter code for information source.

COMMENT ATTACHED — Significant information summarized or explained and attached.

DOCUMENT ATTACHED — Significant information is in an existing document which is attached.

*** BY WHOM** (Check and insert appropriate letter)

A — DFAE

B — Using Service

C — Construction Service

D — Designer

E — Other (Check Comments Attached and explain)

documentation checklist

4-8

D. MECHANICAL, ELECTRICAL, & UTILITY SYSTEMS

ITEM

D-1	Fuel considerations and cost comparison analysis
D-2	Energy requirements appraisal (ERA)
D-3	Conformance with DOD Energy Reduction requirements
D-4	Evaluation of existing and/or proposed utility systems
	Other Mechanical and Utility Systems (List and number items)
	1. See Special Requirements, Paragraph 3 (SRP-3)

Required or Not Required	To Be Determined	Comment Attached	Document Attached
R	D		
R	D		1
R	D		
R	D		

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documentation checklist

4-9

E. ENVIRONMENTAL CONSIDERATIONS

ITEM		Required or Not Required	To Be Determined	Comment Attached	Document Attached
E-1	Environmental impact assessment	R	D		1
E-2	EIA conclusions require Environmental Impact Statement	NR			
E-3	Determination of health, environmental or related hazards. Assistance to determine existence of any health, environmental or related hazard may be requested from Aberdeen Proving Ground, MD 21010, the Office of the Surgeon General, Attn: DASG-HCH (Army Environmental Hygiene Agency)	NR			
E-4	Air/water pollution permit, coordination with agencies and compliance with standards at Federal, state and local level	NR			
E-5	Corrective measures associated with Environmental Impact Statements or assessment—list separately and evaluate.	NR			
	Other environmental considerations (list and number items)				
	1. See Supplemental Data Detailed Project Justification Paragraph D9.				

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documentation checklist

4-10

APPENDIX D
TECHNICAL DATA CHECKLIST

A. SPECIAL CONSIDERATIONS

ITEM		Required or Not Required	To Be Determined	Comment Attached	Document Attached
A-1	Factors of risk, restriction or unusual circumstance expected to increase costs beyond applicable area averages	NR			
A-2	Construction phasing requirements	R	D		
A-3	Functional support equipment (mechanical, electrical, structural, and security) to be built in	NR			
A-4	Equipment in place and justification	NR			
A-5	Other equipment and furniture (O&MA, OPA) and costs	NR			
A-6	Special studies and tests (hazards analyses, compatibility testing, new technology testing, etc.)	NR			
A-7	Type of construction (permanent, temporary, semi-permanent)	NR			
A-8	Government furnished equipment (quantities, procurement time, availability and special handling and storage requirements). Funds used for procurement.	NR			
	Other special considerations (list and number items)				

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technical data checklist

4-12

B. SITE DEVELOPMENT

ITEM		Required or Not Required	To Be Determined	Comment Attached	Document Attached
B-1	Construction restrictions or guidelines pertaining to site access and preferred construction routes	R	A		
(A)					
(B)	Airfield clearance, explosive storage, working hours, safety, etc.	NR			
(C)	Facilities and/or functions or adjoining areas (structures, materials, impact)	R	A		
B-2	Real estate actions (acquisition, disposal, lease, right-of-way)	NR			
B-3	Demolition/relocation required (data)				
(A)	Special considerations due to explosives/radioactivity/chemical contamination/asbestos emissions/toxic gases	NR			
(B)	Restrictions on disposal of demolished/relocated material including hazardous waste	NR			
B-4	Pavement types and requirements (including traffic surveys and MTMC coordination)	NR			
B-5	Landscape considerations				
(A)	Protection of existing vegetation	R	A		
(B)	Stockpile topsoil	NR			
Other Site Development (List and number items)					
1. There is a possibility that the existing lighting may contain PCB's in the ballasts.					

REQUIRED OR NOT REQUIRED — Not relevant or no information to communicate. Enter "R" if item is relevant and is required for this project. Enter "NR" if item is irrelevant and is not required for this project.

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technical data checklist

4-13

C. ARCHITECTURAL & STRUCTURAL

ITEM		Required or Not Required	To Be Determined	Comment Attached	Document Attached
C-1	Vibration-producing equipment requiring isolation	R	D		
C-2	Seismic zone and other design load criteria (typhoon, hurricanes, earthquake loads, high or low loss potential)	NR			
C-3	Protective shelter evaluation and resistant design criteria (conventional/nuclear blast and radiation, chemical/biological)	NR			
C-4	Unusual foundation requirements (pier, pile, caisson, deep foundations, mat, special treatment, permafrost areas, soil bearing)	NR			
C-5	Designation and strength of units to be accommodated	NR			
C-6	Requirements and data for special design projects	NR			
C-7	Unusual floor and roof loads (safes, equipment)	NR			
C-8	Security features (arms rooms, vaults, interior secure areas)	NR			
Other Architectural & Structural (List and number items)					

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technical data checklist

4-14

D. MECHANICAL, ELECTRICAL, & UTILITY SYSTEMS

ITEM		Required or Not Required	To Be • Determined	Comment Attached	Document Attached
D-1	Special mechanical requirements or considerations (elevator, crane, hoist, etc.)	NR			
D-2	Special peak usage periods and peak leveling techniques	NR			
D-3	Maintenance considerations (accessibility of equipment, compatibility with existing equipment)	R	D		
D-4	Plumbing—availability, general system type and characteristics (proposed and/or existing, incl. compressed air and gas)	R	D		
D-5	Heating—availability, general system type and characteristics (proposed and/or existing)	NR			
D-6	Ventilating, air condition/refrigeration—availability, general system type and characteristics (proposed and/or existing)	R	D		
D-7	Electrical—availability, general system type and characteristics incl. airfield lighting, communication, etc. (proposed and/or existing)	NR			
D-8	Water supply/waste treatment—availability, general system type and characteristics (proposed and/or existing)	NR			
D-9	Energy requirements/fuel conversion (sources, availability, loads, types of fuel, etc.)	R	D		
D-10	Solar energy evaluation	NR			
Other Mechanical & Utility Systems (List and number items)					

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technical data checklist

4-15

E. ENVIRONMENTAL CONSIDERATIONS

ITEM		Required or Not Required	To Be Determined	Comment Attached	Document Attached
E-1	Waste water treatment, air quality, and solid waste disposal criteria	NR			
	Other Environmental Considerations (List and number items)				

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- D — Designer
- E — Other (Check Comments Attached and explain)

technical data checklist

4-16

F. FIRE PROTECTION

ITEM

Required or Not Required	To Be Determined	Comment Attached	Document Attached
NR			

F-1 Special fire protection systems or features (detection and suppression equipment, hazards, etc.)
Other Fire Protection Considerations (List and number items)

REQUIRED OR NOT REQUIRED — Not relevant or no information to communicate. Enter "R" if item is relevant and is required for this project. Enter "NR" if item is irrelevant and is not required for this project.

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technical data checklist

4-17

1. COMPONENT ARMY	FY 19 <u>94</u> MILITARY CONSTRUCTION PROJECT DATA			2. DATE 29 October 93	
3. INSTALLATION AND LOCATION Fort Campbell, Kentucky			4. PROJECT TITLE ELECTRICAL AND CONTROL SYSTEM IMPROVEMENTS		
5. PROGRAM ELEMENT	6. CATEGORY CODE	7. PROJECT NUMBER ECIP #2	8. PROJECT COST (\$000) \$560		
9. COST ESTIMATES					
ITEM		U/M	QUANTITY	UNIT COST	COST (\$000)
Primary Facility					
Energy Management Control system Components		Lot	1	480,000	480
Subtotal					480
Contingency (10%)					50
Total Contract Cost					530
Supervision, Inspection and Overhead (5.0%)					30
Total Request					560
<p>10. DESCRIPTION OF PROPOSED CONSTRUCTION</p> <p>The existing dual temperature water pumps in buildings 6942 and 6943 operate in a constant speed manner 8760 hours per year. The addition of variable speed drives will allow the speed of the pumps to be varied, thus varying the system water flow. The water flow will be varied to meet the system heating or cooling load. Water in excess of that required to meet the heating or cooling demand will not be pumped.</p> <p>Currently, the diesel fired generators at the water treatment plant and the Boiling Springs Pump Station are only run during periods of power interruption, or to test the generators. The proposed construction will consist of new controls linking the generators to the Post Energy Management Control System. The new controls will allow for the remote operation of the generators and include start-stop capability. The generators will be used to the electric of the respective plants during periods of the Post's peak electric demand.</p> <p>The Energy Management Control System (EMCS) extension and expansion will include adding fifteen (15) buildings to the current Post EMCS. The EMCS will provide for remote monitoring and start-stop capability for each of the building systems that are connected to the system.</p> <p>The implementation of this project will save 1162 MBtu/Yr of electrical energy. The first year savings is \$143,125 and the Savings to Investment Ratio (SIR) is 3.33.</p> <p>11. REQUIREMENT</p> <p>Project: The proposed project is comprised of adding variable speed drives to the dual temperature water pumps and two way valves to fan coil units in buildings 6942 and 6943; configuring the controls for the generator at the Water Treatment Plant and the Boiling Springs Pump Station for remote operation to peak shave electric load; and the extension and expansion of the EMCS to fifteen (15) buildings (80, 2702, 2840, 3069, 3071, 3934, 5380, 6627, 6636, 6921A, 7243, 7262, 7264, 7268 and 7272).</p> <p>Requirement: The project is required to reduce the energy consumption of lighting and to comply with the Army Energy Resources Management Plan (ERMP) and Executive Order 12759. The proposed project will reduce annual energy consumption by 1162 MBTU/YR and annual energy cost by \$143,125.</p> <p>Current Situation: The existing dual water temperature pumps in buildings 6942 and 6943 operate 8760 hours per year at a constant flow and speed. The existing generators at the Water Treatment Plant and the Boiling springs Pump Station are not used to peak shave the post electric demand. Buildings 80, 2702, 2840, 3069, 3071, 3934, 5380, 6627, 6636, 6921A, 7243, 7262, 7264, 7268 and 7272 are not presently connected to the Post EMCS.</p>					

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5. PROGRAM ELEMENT	6. CATEGORY CODE	7. PROJECT NUMBER ECIP #2	8. PROJECT COST (\$000) \$558.4		
9. COST ESTIMATES					
ITEM		U/M	QUANTITY	UNIT COST	COST (\$000)
Primary Facility					
Interior and Exterior Light Fixtures		Lot	1	483,454	483.5
Subtotal					483.5
Contingency (10%)					48.3
Total Contract Cost					531.8
Supervision, Inspection and Overhead (5.0%)					26.6
Total Request					558.4
<p>10. DESCRIPTION OF PROPOSED CONSTRUCTION</p> <p>The existing dual temperature water pumps in buildings 6942 and 6943 operate in a constant speed manner 8760 hours per year. The addition of variable speed drives will allow the speed of the pumps to be varied, thus varying the system water flow. The water flow will be varied to meet the system heating or cooling load. Water in excess of that required to meet the heating or cooling demand will not be pumped.</p> <p>Currently, the diesel fired generators at the water treatment plant and the Boiling Springs Pump Station are only run during periods of power interruption, or to test the generators. The proposed construction will consist of new controls linking the generators to the Post Energy Management Control System. The new controls will allow for the remote operation of the generators and include start-stop capability. The generators will be used to the electric of the respective plants during periods of the Post's peak electric demand.</p> <p>The Energy Management Control System (EMCS) extension and expansion will include adding fifteen (15) buildings to the current Post EMCS. The EMCS will provide for remote monitoring and start-stop capability for each of the building systems that are connected to the system.</p> <p>The implementation of this project will save 1162 MBtu/Yr of electrical energy. The first year savings is \$143,125 and the Savings to Investment Ratio (SIR) is 3.33.</p> <p>11. REQUIREMENT</p> <p>Project: The proposed project is comprised of adding variable speed drives to the dual temperature water pumps and two way valves to fan coil units in buildings 6942 and 6943; configuring the controls for the generator at the Water Treatment Plant and the Boiling Springs Pump Station for remote operation to peak shave electric load; and the extension and expansion of the EMCS to fifteen (15) buildings (80, 2702, 2840, 3069, 3071, 3934, 5380, 6627, 6636, 6921A, 7243, 7262, 7264, 7268 and 7272).</p> <p>Requirement: The project is required to reduce the energy consumption of lighting and to comply with the Army Energy Resources Management Plan (ERMP) and Executive Order 12759. The proposed project will reduce annual energy consumption by 1162 MBTU/YR and annual energy cost by \$143,125.</p> <p>Current Situation: The existing dual water temperature pumps in buildings 6942 and 6943 operate 8760 hours per year at a constant flow and speed. The existing generators at the Water Treatment Plant and the Boiling springs Pump Station are not used to peak shave the post electric demand. Buildings 80, 2702, 2840, 3069, 3071, 3934, 5380, 6627, 6636, 6921A, 7243, 7262, 7264, 7268 and 7272 are not presently connected to the Post EMCS.</p>					

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4. PROJECT TITLE ELECTRICAL AND CONTROL SYSTEM IMPROVEMENTS		5. PROJECT NUMBER ECIP #2									
<p>Impact if not provided: If the proposed project is not funded, a reduction of 1162 MBtu/YR cannot be achieved, and excessive amounts of energy will continue to be used. There will be no contribution to energy reduction goals established for United States Army facilities by Army Headquarters.</p> <p style="text-align: center;">_____ Colonel, USA Commanding</p> <table> <tr> <td>ESTIMATED CONSTRUCTION START:</td> <td>September 1994</td> <td>INDEX:</td> </tr> <tr> <td>ESTIMATED MIDPOINT OF CONSTRUCTION:</td> <td>April 1995</td> <td>INDEX:</td> </tr> <tr> <td>ESTIMATED CONSTRUCTION COMPLETION:</td> <td>November 1995</td> <td>INDEX:</td> </tr> </table> <p style="text-align: center;">DETAILED JUSTIFICATIONS</p> <p>D1. GENERAL</p> <p>The proposed project encompasses the addition of variable speed drives in two (2) buildings, the addition of controls to two generators, and extension and expansion of the Post EMCS to fifteen (15) buildings.</p> <p>D2. ACCOMMODATIONS NOW IN USE:</p> <p>D3. ANALYSIS OF DEFICIENCY:</p> <p>Currently, the existing dual temperature water pumps in buildings 6942 and 6943 operate 8760 hours per year at a constant flow and speed. The existing generators at the Water Treatment Plant and the Boiling Springs Pump Station are not used to peak shave the post electric demand in buildings 80, 2702, 2840, 3069, 3071, 3934, 5380, 6627, 6636. The current deficiency results in large amounts of energy usage and cost.</p>			ESTIMATED CONSTRUCTION START:	September 1994	INDEX:	ESTIMATED MIDPOINT OF CONSTRUCTION:	April 1995	INDEX:	ESTIMATED CONSTRUCTION COMPLETION:	November 1995	INDEX:
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<p>D4. CONSIDERATION OF ALTERNATIVES:</p> <p>The only alternative to proposed project is to not install the improvements. If the project is not installed, 1162 MBtu/Yr of energy and \$143,125 per year will be saved.</p> <p>D5. CRITERIA FOR PROPOSED PROJECT:</p> <p>The proposed project will conform with all applicable federal and United States Army Regulations.</p> <p>D6. PROGRAM FOR RELATED EQUIPMENT:</p> <p>No equipment funded from appropriations other than MCA are required.</p> <p>D7. DISPOSAL OF PRESENT ASSETS:</p> <p>No assets will be disposed.</p> <p>D8. SURVIVAL FACILITIES:</p> <p>The proposed project is not suitable for inclusion of protective shelters.</p> <p>D9. SUMMARY OF ENVIRONMENTAL CONSEQUENCES:</p> <p>The proposed project has been analyzed and will not adversely impact the environment. Energy savings resulting from the project will conserve natural resources.</p> <p>D10. EVALUATION OF FLOOD HAZARDS AND ENCROACHMENT ON WETLANDS:</p> <p>It has been determined that these facilities are not located in a flood plain and they do not encroach on wetlands.</p> <p>D11. ECONOMIC JUSTIFICATION:</p> <p>The proposed project qualifies under ECIP Guidelines in AR-415-15. SIR for the project is 3.33 with a simple payback of 3.90 years. See Economic Analysis, SRP-1</p>		

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<p>D12. UTILITY AND COMMUNICATION SUPPORT:</p> <p>A. No related utility support projects are programmed. Adequate utilities are available to support the project.</p> <p>B. No telecommunication support is required.</p> <p>D13. PROTECTION OF HISTORIC PLACES AND ARCHEOLOGICAL SITES:</p> <p>The project involves the addition of electrical and control systems located in existing buildings. Review procedures have been implemented for this project in accordance with 36 CFR 800. The review has established that there will be no effect.</p> <p>D14. PROJECT DEVELOPMENT BROCHURE (PART 1):</p> <p>A Project Development Brochure was prepared on 29 October 93 and is attached as a part of the programming documentation.</p> <p>D15. ENERGY REQUIREMENTS:</p> <p>The proposed project will reduce present energy consumption by 1162 MBtu/Yr at the cost savings of \$143,125 per year. See Energy Requirements Appraisal (ERA) in Special Requirements, Paragraph 3 (SRP-3).</p> <p>D16. PROVISION FOR THE HANDICAPPED:</p> <p>No provisions for the handicapped will be made since the scope of the project is in no way applicable to designing for the handicapped.</p> <p>D17. REAL PROPERTY MAINTENANCE ACTIVITY (RPMA) ANALYSIS:</p> <p>A. Physical impact: There will be an addition of variable speed drives and controls. No not structures will be added.</p>		

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<p>B. Operations and Maintenance (O&M) impact:</p> <table border="1"> <thead> <tr> <th><u>YEAR</u></th> <th><u>O&M</u> <u>NET CHANGE (\$000)</u></th> </tr> </thead> <tbody> <tr> <td>1994</td> <td>0.0</td> </tr> <tr> <td>(BOD)</td> <td>0.0</td> </tr> <tr> <td>1995</td> <td>-10,400</td> </tr> <tr> <td>1996</td> <td>-10,400</td> </tr> </tbody> </table> <p>C. Backlog of Maintenance and Repair (BMAR) impact:</p> <p>There will be no net change in the number of systems. There will be no effect on BMAR.</p> <p>D18. COMMERCIAL ACTIVITIES:</p> <p>The proposed project is not a "New Start Expansion" as defined by DA Circular 235-1. The project has been reviewed in light of the requirements of commercial and industrial facilities. It has been determined that whereas the project does not affect commercial facilities, the requirements of DA Circular 235-1 does not apply.</p>			<u>YEAR</u>	<u>O&M</u> <u>NET CHANGE (\$000)</u>	1994	0.0	(BOD)	0.0	1995	-10,400	1996	-10,400
<u>YEAR</u>	<u>O&M</u> <u>NET CHANGE (\$000)</u>											
1994	0.0											
(BOD)	0.0											
1995	-10,400											
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<p>Life Cycle Cost Analysis Project Title: Electrical and Control System Improvements Fiscal Year: 1994 Analysis Date 10/13/93 Economic Life: Twenty (20) Years</p> <p>1. INVESTMENT</p> <table style="width: 100%;"> <tr><td style="width: 60%;">A. CONSTRUCTION COST</td><td style="text-align: right;">\$507,606</td></tr> <tr><td>B. SIOH</td><td style="text-align: right;">25,380</td></tr> <tr><td>C. DESIGN COST</td><td style="text-align: right;">25,380</td></tr> <tr><td>D. ENERGY CREDIT CALC</td><td style="text-align: right;">-0-</td></tr> <tr><td>E. SALVAGE VALUE</td><td style="text-align: right;">-0-</td></tr> <tr><td>F. TOTAL INVESTMENT</td><td style="text-align: right;">\$558,366</td></tr> </table> <p>2. ENERGY SAVINGS ANALYSIS DATE ANNUAL SAVINGS, UNIT COST & DISCOUNTED SAVINGS</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">FUEL</th> <th style="text-align: center;">COST \$MBtu (1)</th> <th style="text-align: center;">SAVINGS MBtu/YR(2)</th> <th style="text-align: center;">ANNUAL \$ SAVINGS(3)</th> <th style="text-align: center;">DISCOUNT FACTOR(4)</th> <th style="text-align: center;">DISCOUNTED SAVINGS(5)</th> </tr> </thead> <tbody> <tr><td>A. ELECT</td><td style="text-align: center;">6.18</td><td style="text-align: center;">11,203</td><td style="text-align: center;">69,235</td><td style="text-align: center;">14.65</td><td style="text-align: center;">1,014,286</td></tr> <tr><td>B. DIST</td><td style="text-align: center;">4.98</td><td style="text-align: center;">-16,184</td><td style="text-align: center;">-80,596</td><td style="text-align: center;">17.70</td><td style="text-align: center;">-1,426,555</td></tr> <tr><td>C. RESID</td><td style="text-align: center;">0</td><td style="text-align: center;">0</td><td style="text-align: center;">0</td><td style="text-align: center;">0</td><td style="text-align: center;">0</td></tr> <tr><td>D. NG</td><td style="text-align: center;">4.00</td><td style="text-align: center;">6,143</td><td style="text-align: center;">24,572</td><td style="text-align: center;">20.60</td><td style="text-align: center;">506,183</td></tr> <tr><td>E. COAL</td><td style="text-align: center;">0</td><td style="text-align: center;">0</td><td style="text-align: center;">0</td><td style="text-align: center;">16.32</td><td style="text-align: center;">0</td></tr> <tr><td>F. DEMAND SAVINGS</td><td></td><td style="text-align: center;">0</td><td style="text-align: center;">140,315</td><td style="text-align: center;">13.59</td><td style="text-align: center;">1,906,881</td></tr> <tr><td>G. TOTAL</td><td></td><td style="text-align: center;">1162</td><td style="text-align: center;">153,525</td><td></td><td style="text-align: center;">2,000,795</td></tr> </tbody> </table> <p>3. NON-ENERGY SAVINGS</p> <p>A. ANNUAL RECURRING</p> <table style="width: 100%;"> <tr><td style="width: 30%;">(1)DISCOUNT FACTOR</td><td style="text-align: center;">13.59</td><td style="width: 30%;"></td><td style="text-align: right;">-10,400</td></tr> <tr><td>(2)DISCOUNTED SAVINGS</td><td></td><td></td><td style="text-align: right;">-141,336</td></tr> </table> <p>B. NON-RECURRING SAVINGS</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">ITEM</th> <th style="text-align: center;">SAVINGS (+) COST (-)(1)</th> <th style="text-align: center;">YEAR OF OCCURRENCE(2)</th> <th style="text-align: center;">DISCOUNT FACTOR</th> <th style="text-align: center;">DISCOUNTED SAVINGS (+) COST (-)(4)</th> </tr> </thead> <tbody> <tr><td>TOTAL</td><td style="text-align: center;">0</td><td style="text-align: center;">0</td><td style="text-align: center;">0</td><td style="text-align: center;">0</td></tr> </tbody> </table> <p>C. TOTAL NON ENERGY DISCOUNTED SAVINGS (+)/COST(-) \$ -141,336</p> <p>4. FIRST YEAR DOLLAR SAVINGS \$ 143,125</p> <p>5. SIMPLE PAYBACK PERIOD 3.90 Yrs</p> <p>6. TOTAL NET DISCOUNTED SAVINGS \$1,859,459</p> <p>7. SAVINGS TO INVESTMENT RATIO 3.33</p> <p>8. ADJUSTED INTERNAL RATE OF RETURN 10.45%</p>			A. CONSTRUCTION COST	\$507,606	B. SIOH	25,380	C. DESIGN COST	25,380	D. ENERGY CREDIT CALC	-0-	E. SALVAGE VALUE	-0-	F. TOTAL INVESTMENT	\$558,366	FUEL	COST \$MBtu (1)	SAVINGS MBtu/YR(2)	ANNUAL \$ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)	A. ELECT	6.18	11,203	69,235	14.65	1,014,286	B. DIST	4.98	-16,184	-80,596	17.70	-1,426,555	C. RESID	0	0	0	0	0	D. NG	4.00	6,143	24,572	20.60	506,183	E. COAL	0	0	0	16.32	0	F. DEMAND SAVINGS		0	140,315	13.59	1,906,881	G. TOTAL		1162	153,525		2,000,795	(1)DISCOUNT FACTOR	13.59		-10,400	(2)DISCOUNTED SAVINGS			-141,336	ITEM	SAVINGS (+) COST (-)(1)	YEAR OF OCCURRENCE(2)	DISCOUNT FACTOR	DISCOUNTED SAVINGS (+) COST (-)(4)	TOTAL	0	0	0	0
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TOTAL	0	0	0	0																																																																												

1. COMPONENT ARMY	FY 19 <u>94</u> MILITARY CONSTRUCTION PROJECT DATA	2. DATE 29 October 93
3. INSTALLATION AND LOCATION Fort Campbell, Kentucky		
4. PROJECT TITLE ELECTRICAL AND CONTROL SYSTEM IMPROVEMENTS		5. PROJECT NUMBER ECIP #2
4. FIRST YEAR DOLLAR SAVINGS		\$ 143,125
5. TOTAL NET DISCOUNTED SAVINGS		\$1,859,459
6. DISCOUNTED SAVINGS RATIO		3.33
7. SIMPLE PAYBACK		3.90 Yrs

1. COMPONENT ARMY	FY 19 <u>94</u> MILITARY CONSTRUCTION PROJECT DATA	2. DATE 29 October 93
3. INSTALLATION AND LOCATION Fort Campbell, Kentucky		
4. PROJECT TITLE ELECTRICAL AND CONTROL SYSTEM IMPROVEMENTS		5. PROJECT NUMBER ECIP #2
<p>SPECIAL REQUIREMENTS PARAGRAPH 3 (SRP-3):</p> <p>Energy Requirements Appraisal (ERA)</p> <p>1. Project Description: Add variable speed drives, two-way valves and EMCS to existing facilities.</p> <p>2. Estimated Energy Consumption: The pumps currently operate at constant flow and speed. The generators and buildings are not presently connected to the EMCS. 1162 MBtu/Yr of energy can be saved by implementing the project.</p> <p>3. Energy Sources: No new energy sources are required for the proposed project. The use of solar energy for this project is impractical.</p> <p>4. Energy Use Impacts: The proposed project will substantially reduce the consumption of electricity and fuel oil. The burden on the existing base distribution system will be lessened.</p> <p>5. Energy Conservation: The proposed project will reduce annual energy consumption by 1162 MBtu/Yr with annual energy cost savings of \$143,125. The project complies with Army Resources Management Plan (ERMP) and Executive Order 12759.</p> <p>6. Energy Alternatives: The proposed project represents the greatest possible reduction in energy consumption, 1162 MBtu/Yr. The current levels do not exceed the levels recommended by ASHRAE.</p> <p>7. Energy Effects: The proposed project provides positive environmental effects. It reduces the current energy consumption by 1162 MBtu/Yr, effectively reducing the consumption of non-renewable fuel sources. The degrading of environmental standards would not make more efficient energy sources available.</p> <p>8. Basis of Approval: Total energy requirements and alternative fuel sources have been considered and included in this appraisal or discarded as applicable.</p>		

ENERGY SAVINGS OPPORTUNITY SURVEY FORT CAMPBELL, KENTUCKY

ECOs 7, 8, & 9 PROJECT SUMMARY

BUILDING NUMBER	BUILDING AREA (F ²)	ECO NUMBER	BASELINE ENERGY (MBTU)	ECO ENERGY (MBTU)	ENERGY SAVINGS (MBTU)	1ST YEAR SAVINGS	INVESTMENT COSTS	SPB (YR)	SIR
Bolling Springs									
1746	N/A	7	1339	6409	-5070	\$14,866	\$25,181	1.69	3.16
6942	N/A	7	2232	10072	-7840	27,815	25,181	0.91	7.41
6943	38,098	9	334	115	219	28,172	13,677	6.95	2.06
80	38,049	9	223	77	146	1,312	12,399	9.45	1.52
2702	28,580	10	2459	1726	733	4,044	24,842	6.14	2.60
2840	74,021	10	3428	2189	1,239	7,010	16,625	2.37	6.60
3069	4,561	10	4561	3108	1,453	8,007	57,244	7.15	2.23
3071	NA	10	1757	1112	645	3,659	46,477	12.70	1.23
3934	NA	10	1757	1112	645	3,659	46,477	12.70	1.23
5380	11,200	10	1120	757	363	2,025	21,045	10.39	1.52
6627	26,460	10	2712	1846	866	4,866	37,236	7.65	2.06
6636	2,969	10	2969	2418	551	2,579	20,629	8.00	2.27
6921A	2,879	10	2879	1782	1,097	6,423	30,693	4.78	3.21
7243	1,470	10	15705	15705	0	*****	14,670	*****	****
7262	41,117	10	7430	5941	1,489	7,096	36,330	5.12	3.49
7264	69,293	10	6798	5573	1,225	5,789	35,132	6.07	2.97
7268	60,000	10	7750	6382	1,368	6,348	37,306	5.88	3.11
7272	60,400	10	6570	5333	1,237	5,831	37,306	6.40	2.82
	38,968	10	4782	3986	796	3,624	19,916	5.50	3.38
TOTALS									
—	498,015	—	76,805	75,643	1,162	143,125	558,366	3.90	3.33

LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: ECO7910

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) LCCID 1.072

INSTALLATION & LOCATION: FT CAMPBELL REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: 7-9-10TLT ECO 7, 9, AND 10 TOTAL

FISCAL YEAR 1994 DISCRETE PORTION NAME: ECO

ANALYSIS DATE: 10-27-93 ECONOMIC LIFE 20 YEARS PREPARED BY: KEITH DERRINGTON

1. INVESTMENT

A. CONSTRUCTION COST \$ 507606.

B. SIOH \$ 25380.

C. DESIGN COST \$ 25380.

D. TOTAL COST (1A+1B+1C) \$ 558366.

E. SALVAGE VALUE OF EXISTING EQUIPMENT \$ 0.

F. PUBLIC UTILITY COMPANY REBATE \$ 0.

G. TOTAL INVESTMENT (1D - 1E - 1F) \$ 558366.

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1992

FUEL	UNIT COST \$/MBTU(1)	SAVINGS MBTU/YR(2)	ANNUAL \$ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	\$ 6.18	11203.	\$ 69235.	14.65	\$ 1014286.
B. DIST	\$ 4.98	-16184.	\$ -80596.	17.70	\$ -1426555.
C. RESID	\$.00	0.	\$ 0.	20.99	\$ 0.
D. NAT G	\$ 4.00	6143.	\$ 24572.	20.60	\$ 506183.
E. COAL	\$.00	0.	\$ 0.	16.32	\$ 0.
F. PPG	\$.00	0.	\$ 0.	13.59	\$ 0.
M. DEMAND SAVINGS			\$ 140315.	13.59	\$ 1906881.
N. TOTAL		1162.	\$ 153525.		\$ 2000795.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-) \$ -10400.

(1) DISCOUNT FACTOR (TABLE A) 13.59

(2) DISCOUNTED SAVING/COST (3A X 3A1) \$ -141336.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) COST(-)	YR OC	DISCNT FACTR	DISCOUNTED SAVINGS(+)/ COST(-)(4)
	(1)	(2)	(3)	

d. TOTAL \$ 0. 0.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-)(3A2+3Bd4) \$ -141336.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3B1d/(YRS \text{ ECONOMIC LIFE}))$ \$ 143125.

5. SIMPLE PAYBACK PERIOD (1G/4) 3.90 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 1859459.

7. SAVINGS TO INVESTMENT RATIO (SIR)=(5 / 1G)= 3.33

(IF < 1 PROJECT DOES NOT QUALIFY)

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): 10.45 %

FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 7: ELECTRIC PEAK SHAVING AT WATER TREATMENT PLANT AND BOILING SPRINGS

30 SEPTEMBER 1993

LOCATION: BLDG 1746, WATER TREATMENT PLANT
TYPE/SIZE: 700 KW DIESEL ENGINE DRIVEN GENERATOR
ELECTRICAL: 2400 VOLT, 3 PHASE, 60 HERTZ

PAGE 1 OF 2

BASELINE ENERGY CONSUMPTION:

Month	Hours	Electrical Demand	Electricity MBTU	Fuel Oil MBTU	Energy Cost	Demand Cost	Utility Cost
January	109	500 KW	186	0	\$1,152	\$5,890	\$7,042
February	109	500 KW	186	0	\$1,152	\$5,890	\$7,042
March	108	500 KW	186	0	\$1,152	\$5,890	\$7,042
April	109	500 KW	186	0	\$1,152	\$5,890	\$7,042
May	109	500 KW	186	0	\$1,152	\$5,890	\$7,042
June	109	500 KW	186	0	\$1,152	\$5,890	\$7,042
July	109	500 KW	186	0	\$1,152	\$5,890	\$7,042
August	109	500 KW	186	0	\$1,152	\$5,890	\$7,042
September	108	500 KW	186	0	\$1,152	\$5,890	\$7,042
October	109	500 KW	186	0	\$1,152	\$5,890	\$7,042
November	109	500 KW	186	0	\$1,152	\$5,890	\$7,042
December	109	500 KW	186	0	\$1,152	\$5,890	\$7,042

BASELINE ELECTRIC ENERGY CONSUMPTION

2232 MBTU

BASELINE FUEL OIL ENERGY CONSUMPTION

0 MBTU

BASELINE ELECTRIC ENERGY COST

\$13,826

BASELINE ELECTRIC DEMAND COST

\$70,680

BASELINE FUEL OIL ENERGY COST

\$0

FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 7: ELECTRIC PEAK SHAVING AT WATER TREATMENT PLANT AND BOILING SPRINGS

30 SEPTEMBER 1993

LOCATION: BLDG 1746, WATER TREATMENT PLANT
 TYPE/SIZE: 700 KW DIESEL ENGINE DRIVEN GENERATOR
 ELECTRICAL: 2400 VOLT, 3 PHASE, 60 HERTZ

PAGE 2 OF 2

PEAK SHAVING GENERATOR ENERGY CONSUMPTION:

Month	Hours	Electrical Demand	Electricity MBTU	Fuel Oil MBTU	Energy Cost	Demand Cost	Utility Cost
January	109	500 KW	0	839	\$4,180	\$0	\$4,180
February	109	500 KW	0	839	\$4,180	\$0	\$4,180
March	109	500 KW	0	839	\$4,180	\$0	\$4,180
April	109	500 KW	0	839	\$4,180	\$0	\$4,180
May	109	500 KW	0	839	\$4,180	\$0	\$4,180
June	109	500 KW	0	839	\$4,180	\$0	\$4,180
July	109	500 KW	0	839	\$4,180	\$0	\$4,180
August	109	500 KW	0	839	\$4,180	\$0	\$4,180
September	109	500 KW	0	839	\$4,180	\$0	\$4,180
October	109	500 KW	0	839	\$4,180	\$0	\$4,180
November	109	500 KW	0	839	\$4,180	\$0	\$4,180
December	109	500 KW	0	839	\$4,180	\$0	\$4,180

ELECTRIC ENERGY CONSUMPTION

0 MBTU

FUEL OIL ENERGY CONSUMPTION

10072 MBTU

ELECTRIC ENERGY COST

\$0

ELECTRIC DEMAND COST

\$0

FUEL OIL ENERGY COST

\$50,157

GENERATOR ENERGY CONSUMPTION

10072 MBTU

ENERGY COST

\$50,157

DEMAND COST

\$0

NET ENERGY SAVINGS

- 7839 MBTU

ENERGY SAVINGS

(\$36,331)

DEMAND SAVINGS

\$70,680

Tue 28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 12:53:04

TITLE PAGE

ENERGY SAVINGS OPPORTUNITY SURVY
FT CAMPBELL, KY
ECO-7: WATER TREATMENT PLANT BLDG 1746

Contract No: 27-93-C-0096

Prepared By: Systems Corp
Estimator: Keith A. Derrington
Estimate Prep. Date: 09/30/93

Current UPB/CSI ID: ORL290

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Tue 28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-7: WATER TREATMENT PLANT BLDG 1746

TIME 12:53:00

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CONTRACTOR INDIRECT SUMMARY.....	5
CSI DIVISION SUMMARY.....	6
SYSTEMS SUMMARY.....	7
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LABOR SUMMARY.....	9

DETAILED ESTIMATE	DETAIL PAGE
1. BUILDING TO THE 5 FOOT LINE	
AA. ELECTRICAL.....	1

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Tue 28 Sep 1993

DETAILED ESTIMATE

U.S. ARMY CORPS of ENGINEERS M-CACES
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
 ECO-7: WATER TREATMENT PLANT BLDG 1746
 1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 12:53:04

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL	QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16900 CONTROLS AND INSTRUMENTATION									
16992 FM CONTROL COMPONENTS									
CD=3 EL 1000 FM CONTACTOR	*** UNIT COSTS: ***			10.00	330.10	1.29	100.00	5.00	436.39
WC=1100	1.00 EA EELEB			10	330	1	100	5	436
CD=3 EL 2000 FM RECEIVER	*** UNIT COSTS: ***			25.00	825.25	3.23	15000.00	750.00	16578.48
WC=1100	1.00 EA EELEB			25	825	3	15,000	750	16,578
TOTAL DIVISION 16 ELECTRICAL				35	1,155	5	15,100	755	17,015
TOTAL FACILITY AA. ELECTRICAL				35	1,155	5	15,100	755	17,015
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE				35	1,155	5	15,100	755	17,015
TOTAL BASE BID				35	1,155	5	15,100	755	17,015
TOTAL ADDITIVE				0	0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY				35	1,155	5	15,100	755	17,015

* * * END OF DETAIL REPORT * * *

28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-7: WATER TREATMENT PLANT BLDG 1746

TIME 12:53:04

PROJECT NOTES

SUMMARY PAGE 1

PROJECT NOTES

ECO-7: PEAK SHAVING GENERATORS

SCOPE OF WORK: EVALUATE USE OF EXISTING CONTINUOUS DUTY GENERATORS FOR
MONTHLY PEAK SHAVING TO SAVE ON DEMAND CHARGES.

Tue 28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
 ECO-7: WATER TREATMENT PLANT BLDG 1746

TIME 12:53:04

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY	COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHER FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL	1.00 EA	17,015	10.0% 1,701	0.0% 0	7.5% 1,404	2.5% 503	0.0% 0	20,623 20623.09
BID ITEM TOTAL	1.00 EA	17,015	1,701	0	1,404	503	0	20,623	20623.09
TOTAL BASE BID		17,015	1,701	0	1,404	503	0	20,623	
TOTAL ADDITIVE		0	0	0	0	0	0	0	
TOTAL INCL ADD		17,015	1,701	0	1,404	503	0	20,623	

Tue 28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
 ECO-7: WATER TREATMENT PLANT BLDG 1746

TIME 12:53:04

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY	DOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00	EA	20,623		20,623	20623.10
	TOTAL CURRENT CONTRACT COST			20,623	0	20,623	
	Cost Growth from 09/93 to 09/94 Index Values: 0000 0000	0.0%		0	0	0	
	ESCALATED CONTRACT COST			20,623	0	20,623	
	Government-Furnished Property			0		0	
	SUBTOTAL			20,623	0	20,623	
	Contingencies	10.0%		2,062	0	2,062	
	SUBTOTAL			22,685	0	22,685	
	SIOB (S&A)	5.5%		1,248	0	1,248	
	CURRENT WORKING ESTIMATE			23,933	0	23,933	

Estimated Construction Time 365 Days

Tue 28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-7: WATER TREATMENT PLANT BLDG 1746

TIME 12:53:04

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PM	QUANTITY	DOM	MANHRS	LABOR	EQUIPMENT	MAT	W/TX	** TOTAL DIRECT *	* SUBCON *	W/OH&P	SUBTOTAL
										AMOUNT	PCT		
AA	GENERAL/PRIME		1.00	EA	35	1,155	5	15,855		17,015	100.0%	0	17,015
	TOTAL DIRECT				35	1,155	5	15,855		17,015	100.0%		

28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-7: WATER TREATMENT PLANT BLDG 1746

TIME 12:53:04

CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PH	SUBTOTAL	*** OVERHEAD ***	AMOUNT	PCT	HOFC%	**** PROFIT ****	AMOUNT	PCT	BOND%	OTHER%	***** TOTAL CONTRACT *****	AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		17,015	1,701	10.0%	0.0		1,404	7.5%	2.5%	0.0%		20,623	100.0%		20623.08
	TOTAL OVERHEAD & PROFIT			1,701	10.0%			1,404	7.5%							

Sue 28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-7: WATER TREATMENT PLANT BLDG 1746

TIME 12:53:04

SI DIVISION SUMMARY

SUMMARY PAGE 1

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	35	1,155	5	15,100	755	17,015
TOTAL DIRECT	35	1,155	5	15,100	755	17,015

Tue 28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-7: WATER TREATMENT PLANT BLDG 1746

TIME 12:53:00

SYSTEMS SUMMARY

SUMMARY PAGE

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	35	1,155	5	15,100	755	17,015
TOTAL DIRECT	35	1,155	5	15,100	755	17,015

28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-7: WATER TREATMENT PLANT BLDG 1746

TIME 12:53:04

EQUIPMENT SUMMARY

SUMMARY PAGE 8

EQUIP DESCRIPTION	LIFE HRS	TL HRLY	OWNRSH	OWNS	OVTH	OWNRSH	EXPENSE	HRLY RATE	UPB RATE	HOURS	TOTAL COST
EMI20 SMALL TOOLS								1.40	1.40	3	5
TOTAL PROJECT EQUIPMENT HOURS										3	5

28 Sep 1993

ABOF SUMMARY

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-7: WATER TREATMENT PLANT BLDG 1746

TIME 12:53:04

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	35	1,155
TOTAL PROJECT MANHOURS								35	1,155

*** END OF SUMMARY REPORT ***

FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 7: ELECTRIC PEAK SHAVING AT WATER TREATMENT PLANT AND BOILING SPRINGS

30 SEPTEMBER 1993

LOCATION: BOILING SPRINGS PUMP HOUSE
TYPE/SIZE: 700 KW DIESEL ENGINE DRIVEN GENERATOR
ELECTRICAL: 480 VOLT, 3 PHASE, 60 HERTZ

PAGE 1 OF 2

BASELINE ENERGY CONSUMPTION:

Month	Hours	Electrical Demand	Electricity MBTU	Fuel Oil MBTU	Energy Cost	Demand Cost	Utility Cost
January	109	300 KW	112	0	\$691	\$3,534	\$4,225
February	109	300 KW	112	0	\$691	\$3,534	\$4,225
March	109	300 KW	112	0	\$691	\$3,534	\$4,225
April	109	300 KW	112	0	\$691	\$3,534	\$4,225
May	109	300 KW	112	0	\$691	\$3,534	\$4,225
June	109	300 KW	112	0	\$691	\$3,534	\$4,225
July	109	300 KW	112	0	\$691	\$3,534	\$4,225
August	109	300 KW	112	0	\$691	\$3,534	\$4,225
September	109	300 KW	112	0	\$691	\$3,534	\$4,225
October	109	300 KW	112	0	\$691	\$3,534	\$4,225
November	109	300 KW	112	0	\$691	\$3,534	\$4,225
December	109	300 KW	112	0	\$691	\$3,534	\$4,225

BASELINE ELECTRIC ENERGY CONSUMPTION

1339 MBTU

BASELINE FUEL OIL ENERGY CONSUMPTION

0 MBTU

BASELINE ELECTRIC ENERGY COST

\$8,295

BASELINE ELECTRIC DEMAND COST

\$42,408

BASELINE FUEL OIL ENERGY COST

\$0

FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 7: ELECTRIC PEAK SHAVING AT WATER TREATMENT PLANT AND BOILING SPRINGS
30 SEPTEMBER 1993

LOCATION: BOILING SPRINGS PUMP HOUSE
TYPE/SIZE: 700 KW DIESEL ENGINE DRIVEN GENERATOR
ELECTRICAL: 480 VOLT, 3 PHASE, 60 HERTZ

PAGE 2 OF 2

PEAK SHAVING GENERATOR ENERGY CONSUMPTION:

Month	Hours	Electrical Demand	Electricity MBTU	Fuel Oil MBTU	Energy Cost	Demand Cost	Utility Cost
January	109	300 KW	0	534	\$2,660	\$0	\$2,660
February	109	300 KW	0	534	\$2,660	\$0	\$2,660
March	109	300 KW	0	534	\$2,660	\$0	\$2,660
April	109	300 KW	0	534	\$2,660	\$0	\$2,660
May	109	300 KW	0	534	\$2,660	\$0	\$2,660
June	109	300 KW	0	534	\$2,660	\$0	\$2,660
July	109	300 KW	0	534	\$2,660	\$0	\$2,660
August	109	300 KW	0	534	\$2,660	\$0	\$2,660
September	109	300 KW	0	534	\$2,660	\$0	\$2,660
October	109	300 KW	0	534	\$2,660	\$0	\$2,660
November	109	300 KW	0	534	\$2,660	\$0	\$2,660
December	109	300 KW	0	534	\$2,660	\$0	\$2,660

ELECTRIC ENERGY CONSUMPTION

0 MBTU

FUEL OIL ENERGY CONSUMPTION

6409 MBTU

ELECTRIC ENERGY COST

\$0

ELECTRIC DEMAND COST

\$0

FUEL OIL ENERGY COST

\$31,918

GENERATOR ENERGY CONSUMPTION

6409 MBTU

ENERGY COST

\$31,918

DEMAND COST

\$0

NET ENERGY SAVINGS

-5070 MBTU

ENERGY SAVINGS (\$23,622)

DEMAND SAVINGS

\$42,408

28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 12:45:51

TITLE PAGE

ENERGY SAVINGS OPPORTUNITY SURVY
FT CAMPBELL, KY
ECO-7: BOILING SPRINGS PUMP HOUSE

Contract No: 27-93-C-0096

Prepared By: Systems Corp
Estimator: Keith A. Derrington
Estimate Prep. Date: 09/30/93

Current UPB/CSI ID: ORL290

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Tue 28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
 ECO-7: BOILING SPRINGS PUMP HOUSE
 1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 12:45:51

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL	QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16900 CONTROLS AND INSTRUMENTATION									
16992 FM CONTROL COMPONENTS									
CD=3 EL 1000 FM CONTACTOR	*** UNIT COSTS: ***			10.00	330.10	1.29	100.00	5.00	436.39
WC=1100	1.00 EA EELEB			10	330	1	100	5	436
CD=3 EL 2000 FM RECEIVER	*** UNIT COSTS: ***			25.00	825.25	3.23	15000.00	750.00	16578.48
WC=1100	1.00 EA EELEB			25	825	3	15,000	750	16,578
TOTAL DIVISION 16 ELECTRICAL				35	1,155	5	15,100	755	17,015
TOTAL FACILITY AA. ELECTRICAL				35	1,155	5	15,100	755	17,015
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE				35	1,155	5	15,100	755	17,015
TOTAL BASE BID				35	1,155	5	15,100	755	17,015
TOTAL ADDITIVE				0	0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY				35	1,155	5	15,100	755	17,015

*** END OF DETAIL REPORT ***

Tue 28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-7: BOILING SPRINGS PUMP HOUSE

TIME 12:45:51

PROJECT NOTES

SUMMARY PAGE 1

PROJECT NOTES

ECO-7: PEAK SHAVING GENERATORS

SCOPE OF WORK: EVALUATE USE OF EXISTING CONTINUOUS DUTY GENERATORS FOR
MONTHLY PEAK SHAVING TO SAVE ON DEMAND CHARGES.

Tue 28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
 ECO-7: BOILING SPRINGS PUMP HOUSE

TIME 12:45:51

ID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY		COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHER FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL			10.0%	0.0%	7.5%	2.5%	0.0%		
		1.00 EA	17,015	1,701	0	1,404	503	0	20,623	20623.09
BID ITEM TOTAL		1.00 EA	17,015	1,701	0	1,404	503	0	20,623	20623.09
TOTAL BASE BID			17,015	1,701	0	1,404	503	0	20,623	
TOTAL ADDITIVE			0	0	0	0	0	0	0	
TOTAL INCL ADD			17,015	1,701	0	1,404	503	0	20,623	

28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVEY / FT CAMPBELL, KY
ECO-7: BOILING SPRINGS PUMP HOUSE

TIME 12:45:51

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY	UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00	EA	20,623		20,623	20623.10
TOTAL CURRENT CONTRACT COST				20,623	0	20,623	
Cost Growth from 09/93 to 09/94 Index Values: 0000 0000		0.0%		0	0	0	
ESCALATED CONTRACT COST				20,623	0	20,623	
Government-Furnished Property				0		0	
SUBTOTAL				20,623	0	20,623	
Contingencies		10.0%		2,062	0	2,062	
SUBTOTAL				22,685	0	22,685	
SIOH (S&A)		5.5%		1,248	0	1,248	
CURRENT WORKING ESTIMATE				23,933	0	23,933	

Estimated Construction Time 365 Days

28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-7: BOILING SPRINGS PUMP HOUSE

TIME 12:45:51

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PM	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT	W/TX	** TOTAL DIRECT * AMOUNT PCT	* SUBCON * W/OH&P	SUBTOTAL
AA	GENERAL/PRIME		1.00	EA	35	1,155	5	15,855		17,015 100.0%	0	17,015
	TOTAL DIRECT				35	1,155	5	15,855		17,015 100.0%		

28 Sep 1993

CONTRACTOR INDIRECT SUMMARY

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-7: BOILING SPRINGS PUMP HOUSE

TIME 12:45:51

SUMMARY PAGE 5

ID	CONTRACTOR	PH	SUBTOTAL	*** OVERHEAD ***	AMOUNT	PCT	HOFC:	**** PROFIT ****	AMOUNT	PCT	BOND:	OTHER:	***** TOTAL CONTRACT *****	AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		17,015	1,701	10.0%	0.0		1,404	7.5%	2.5%	0.0%		20,623	100.0%		20623.08
	TOTAL OVERHEAD & PROFIT			1,701	10.0%			1,404	7.5%							

28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-7: BOILING SPRINGS PUMP HOUSE

TIME 12:45:51

CSI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	35	1,155	5	15,100	755	17,015
TOTAL DIRECT	35	1,155	5	15,100	755	17,015

28 Sep 1993

SYSTEMS SUMMARY

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-7: BOILING SPRINGS PUMP HOUSE

TIME 12:45:51

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	35	1,155	5	15,100	755	17,015
TOTAL DIRECT	35	1,155	5	15,100	755	17,015

Tue 28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-7: BOILING SPRINGS PUMP HOUSE

TIME 12:45:5

EQUIPMENT SUMMARY

SUMMARY PAGE 1

EQUIP DESCRIPTION	LIFE HRS	TL HRLY	OWNRSHP	OWNS	OVTM	OWNRSHP	EXPENSE	HRLY RATE	UPB RATE	HOURS	TOTAL COST
ENI20 SMALL TOOLS								1.40	1.40	3	
TOTAL PROJECT EQUIPMENT HOURS										3	

Tue 28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-7: BOILING SPRINGS PUMP HOUSE

TIME 12:45:51

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	35	1,155
TOTAL PROJECT MANHOURS								35	1,155

* * * END OF SUMMARY REPORT * * *

ECO-9: VARIABLE SPEED CIRCULATION PUMPS

MOTOR TYPE: 10 HP 208/3/60

BUILDING NUMBERS

6943

FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 9: VARIABLE SPEED DRIVES FOR DUAL TEMPERATURE PUMPS

30 SEPTEMBER 1993

LOCATION: BLDG 6943
TYPE/SIZE: VERTICAL SPLIT CASE 10 HP
ELECTRICAL: 208 VOLT, 3 PHASE, 60 HERTZ

PAGE 1 OF 2

10 HORSEPOWER DUAL TEMPERATURE WATER PUMP ENERGY BASELINE

BIN	ANNUAL HOURLY OCCURRENCES	% FULL LOAD	MOTOR EFFICIENCY	ANNUAL ENERGY CONSUMPTION (MBTU/YR)
100/104	2	100	0.85	0
95/99	25	100	0.85	1
90/94	111	100	0.85	3
85/89	352	90	0.85	9
80/84	540	80	0.85	14
75/79	724	67	0.85	18
70/74	980	52	0.85	25
65/69	886	43	0.85	23
60/64	763	35	0.85	19
55/59	668	30	0.85	17
50/54	628	35	0.85	16
45/49	583	40	0.85	15
40/44	608	55	0.85	15
35/39	564	60	0.85	14
30/34	538	65	0.85	14
25/29	358	75	0.85	9
20/24	212	85	0.85	5
15/19	109	95	0.85	3
10/14	50	100	0.85	1
05/09	29	100	0.85	1
00/04	22	100	0.85	1

DUAL TEMPERATURE WATER PUMP BASELINE ENERGY

223 MBTU

DUAL TEMPERATURE WATER PUMP BASELINE ENERGY AND DEMAND COST

\$2,618

ENERGY CONSUMPTION	223 MBTU	ENERGY COST	\$1,377	DEMAND COST	\$1,241
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FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 9: VARIABLE SPEED DRIVES FOR DUAL TEMPERATURE PUMPS
30 SEPTEMBER 1993

LOCATION: BLDG 6043
TYPE/SIZE: VERTICAL SPLIT CASE 10 HP
ELECTRICAL: 208 VOLT, 3 PHASE, 60 HERTZ

PAGE 2 OF 2

10 HORSEPOWER DUAL TEMPERATURE WATER PUMP ENERGY BASELINE

BIN	ANNUAL HOURLY OCCURRENCES	% FULL LOAD	MOTOR EFFICIENCY	ANNUAL ENERGY CONSUMPTION (MBTU/YR)
100/104	2	100	0.85	0
95/99	25	100	0.85	1
90/94	111	100	0.85	3
85/89	352	90	0.85	7
80/84	540	80	0.85	9
75/79	724	67	0.85	8
70/74	980	52	0.85	7
65/69	886	43	0.85	4
60/64	763	35	0.85	2
55/59	668	30	0.85	2
50/54	628	35	0.85	2
45/49	583	40	0.85	2
40/44	608	55	0.85	5
35/39	584	60	0.85	5
30/34	538	65	0.85	6
25/29	358	75	0.85	5
20/24	212	85	0.85	4
15/19	109	95	0.85	3
10/14	50	100	0.85	1
05/09	29	100	0.85	1
00/04	22	100	0.85	1

DUAL TEMPERATURE WATER PUMP BASELINE ENERGY 77 MBTU

DUAL TEMPERATURE WATER PUMP BASELINE ENERGY AND DEMAND COST

\$1,306

ENERGY CONSUMPTION	77 MBTU	ENERGY COST	\$474	DEMAND COST	\$831
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NET ENERGY CONSUMPTION	146 MBTU	NET SAVINGS	\$1,312
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Tue 28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 09:26:47

TITLE PAGE

ENERGY SAVINGS OPPORTUNITY SURVY
FT CAMPBELL, KY
ECO-9: VARIABLE SPEED DRIVE BUILDING 6943

Contract No: 27-93-C-0096

Prepared By: Systems Corp
Estimator: Keith A. Derrington
Estimate Prep. Date: 09/30/93

Current UPB/CSI ID: ORL290

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4-59

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6943E9

Tue 28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-9: VARIABLE SPEED DRIVE BUILDING 6943

TIME 09:26:47

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DETAILED ESTIMATE

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Tue 28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
 ECO-9: VARIABLE SPEED DRIVE BUILDING 6943
 1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 09:26:47

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL	QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16050 BASIC MATERIALS AND METHODS									
16111 5100 IMC BRANCH AND FEEDER CONDUIT EXPOSED CONDITION. ALL 1/2 IN AND 3/4 IN ELBOWS ASSUMED TO BE FIELD BENT									
CD=4 EL 5103 3/4 IN INC CONDUIT W/COUPLING	*** UNIT COSTS: ***			0.06	1.73	0.01	0.58	0.03	2.35
WC=1100	220.00 LF EELEF			13	382	2	128	6	517
16120 1700 600 VOLT FEEDER WIRE, SINGLE STR COPPER CONDUCTOR, PULLED IN COND									
CD=4 EL 1704 NO 8-TYPE THWN	*** UNIT COSTS: ***			7.93	239.19	1.07	145.45	7.27	392.99
WC=1100	0.06 MLF EELEF			0	14	0	9	0	24
16900 CONTROLS AND INSTRUMENTATION									
16920 1000 VARIABLE SPEED DRIVES									
CD=3 EL 1003 VARIABLE SPEED DRIVE 10 HP	*** UNIT COSTS: ***			20.00	660.20	2.58	3580.00	179.00	4421.78
WC=1100	1.00 EA EELEB			20	660	3	3,580	179	4,422
16920 2000 CONTROL CABLE									
CD=3 EL 2001 TWISTED PAIR WIRES 18 AWG	*** UNIT COSTS: ***			8.28	249.82	1.12	820.00	41.00	1111.94
WC=1100	0.20 MLF EELEF			2	50	0	164	8	222
16961 4000 PRESSURE									
CD=3 EL 4001 PRESSURE TRANSDUCER, ELECTRONIC	*** UNIT COSTS: ***			17.00	534.83	1.29	300.00	15.00	851.12
WC=1100	1.00 EA EPIPA			17	535	1	300	15	851
TOTAL DIVISION 16 ELECTRICAL				52	1,641	6	4,180	209	6,036
TOTAL FACILITY AA. ELECTRICAL				52	1,641	6	4,180	209	6,036

CREW ID: ORL290

CURRENCY in DOLLARS

 4-61
 PROJECT ID: 6943E9

Tue 28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
 ECO-9: VARIABLE SPEED DRIVE BUILDING 6943
 1. BUILDING TO THE 5 FOOT LINE / BA. MECHANICAL

TIME 09:26:47

DETAILED ESTIMATE

DETAIL PAGE 2

BASE BID

DIVISION 15 MECHANICAL	QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
15010 GENERAL PROVISIONS									
15049 VALVES									
CD=3 HV 1000 CAP OFF 3 WAY VALVES	***	UNIT COSTS: ***		1.00	29.83	0.00	0.00	0.00	29.83
WC=0900	80.00	HR MSPZZ		80	2,386	0	0	0	2,386
15050 BASIC MATERIALS AND METHODS									
15063 1000 COPPER PIPE AND FITTINGS									
CD=3 HV 1014 PRESSURE FITTING, 4" TO 8" PIPE	***	UNIT COSTS: ***		0.46	14.31	0.11	2.59	0.13	17.14
WC=0800 6" STEM	1.00	EA MPLUC		0	14	0	3	0	17
15100 1300 BALL VALVES									
CD=3 HV 1302 1/2" BALL VALVE	***	UNIT COSTS: ***		0.29	9.06	0.07	4.35	0.22	13.70
WC=0800	1.00	EA MPLUC		0	9	0	4	0	14
TOTAL DIVISION 15 MECHANICAL				81	2,410	0	7	0	2,417
TOTAL FACILITY BA. MECHANICAL				81	2,410	0	7	0	2,417
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE				133	4,051	6	4,187	209	8,453
TOTAL BASE BID				133	4,051	6	4,187	209	8,453
TOTAL ADDITIVE				0	0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY				133	4,051	6	4,187	209	8,453

* * * END OF DETAIL REPORT * * *

CREW ID: ORL290

CURRENCY in DOLLARS

4-62
PROJECT ID: 6943E9

Tue 28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-9: VARIABLE SPEED DRIVE BUILDING 6943

TIME 09:26:47

PROJECT NOTES

SUMMARY PAGE 1

PROJECT NOTES

ECO-9: VARIABLE SPEED CIRCULATION PUMPS

SCOPE OF WORK: EVALUATE USE OF VARIABLE SPEED DRIVES ON HEATING/COOLING
CIRCULATIONS PUMPS IN SELECTED BARRACKS.

CREW ID: ORL290

CURRENCY in DOLLARS

4-63
PROJECT ID: 6943E9

Tue 28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
 ECO-9: VARIABLE SPEED DRIVE BUILDING 6943

TIME 09:26:47

BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY		COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHR FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL	1.00 EA	6,036	10.0% 604	0.0% 0	7.5% 498	2.5% 178	0.0% 0	7,316	7316.30
BA	MECHANICAL	1.00 EA	2,417	10.0% 242	0.0% 0	7.5% 199	2.5% 71	0.0% 0	2,930	2929.85
BID ITEM TOTAL		1.00 EA	8,453	845	0	697	250	0	10,246	10246.15
TOTAL BASE BID			8,453	845	0	697	250	0	10,246	
TOTAL ADDITIVE			0	0	0	0	0	0	0	
TOTAL INCL ADD			8,453	845	0	697	250	0	10,246	

Tue 28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-9: VARIABLE SPEED DRIVE BUILDING 6943

TIME 09:26:47

PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY UOH	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00 EA	10,246		10,246	10246.10
	TOTAL CURRENT CONTRACT COST		10,246	0	10,246	
	Cost Growth from 08/93 to 08/94 Index Values: 0000 0000	0.0%	0	0	0	
	ESCALATED CONTRACT COST		10,246	0	10,246	
	Government-Furnished Property		0		0	
	SUBTOTAL		10,246	0	10,246	
	Contingencies	10.0%	1,025	0	1,025	
	SUBTOTAL		11,271	0	11,271	
	SIOH (S&A)	5.0%	564	0	564	
	CURRENT WORKING ESTIMATE		11,834	0	11,834	

Estimated Construction Time 365 Days

CREW ID: ORL290

CURRENCY in DOLLARS

4-65
PROJECT ID: 6943E9

Tue 28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-9: VARIABLE SPEED DRIVE BUILDING 6943

TIME 09:26:47

CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PH	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT W/TX	** TOTAL DIRECT **	** SUBCON **	W/OH&P	SUBTOTAL
AA	GENERAL/PRIME		1.00	EA	133	4,051	6	4,397	8,453	100.0%	0	8,453
	TOTAL DIRECT				133	4,051	6	4,397	8,453	100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

4-66
PROJECT ID: 6943E9

Tue 28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-9: VARIABLE SPEED DRIVE BUILDING 6943

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CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PM	SUBTOTAL	*** OVERHEAD *** AMOUNT	PCT	HOFC%	**** PROFIT **** AMOUNT	PCT	BOND%	OTHER%	***** TOTAL CONTRACT ***** AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		8,453	845	10.0%	0.0	697	7.5%	2.5%	0.0%	10,246	100.0%	10246.14
	TOTAL OVERHEAD & PROFIT			845	10.0%		697	7.5%					

CREW ID: ORL290

CURRENCY in DOLLARS

4-67
PROJECT ID: 6943E9

Tue 28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-9: VARIABLE SPEED DRIVE BUILDING 6943

TIME 09:26:47

CSI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
15 MECHANICAL	81	2,410	0	7	0	2,417
16 ELECTRICAL	52	1,641	6	4,180	209	6,036
TOTAL DIRECT	133	4,051	6	4,187	209	8,453

CREW ID: ORL290

CURRENCY in DOLLARS

4-68

PROJECT ID: 6943E9

Tue 28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-9: VARIABLE SPEED DRIVE BUILDING 6943

TIME 09:26:47

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
08 PLUMBING	1	23	0	7	0	31
09 HEATING, VENTILATION & AIR CONDIT	80	2,386	0	0	0	2,386
11 INTERIOR ELECTRICAL	52	1,641	6	4,180	209	6,036
TOTAL DIRECT	133	4,051	6	4,187	209	8,453

Tue 28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-9: VARIABLE SPEED DRIVE BUILDING 6943

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EQUIPMENT SUMMARY

SUMMARY PAGE 8

EQUIP DESCRIPTION	LIFE HRS	TL HRLY	OWNRSH	OWNS	OVTM	OWNRSH	EXPENSE	RATE	RATE	HOURS	COST
EMI20 SMALL TOOLS								1.40	1.40	4	6
TOTAL PROJECT EQUIPMENT HOURS										4	6

CREW ID: ORL290

CURRENCY in DOLLARS

4-70
PROJECT ID: 6943E9

Tue 28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-9: VARIABLE SPEED DRIVE BUILDING 6943

TIME 09:26:47

LABOR SUMMARY

SUMMARY PAGE 9

CRAFT DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	44	1,403
LPLUM PLUMBERS	21.25	0.0%	24.0%	4.50	0.00	30.85	25.55	1	23
LSPFI STEAM/PIPEFITTERS	20.95	0.0%	24.0%	3.85	0.00	29.83	26.12	88	2,625
TOTAL PROJECT MANHOURS								133	4,052

* * * END OF SUMMARY REPORT * * *

ECO-9: VARIABLE SPEED CIRCULATION PUMPS

MOTOR TYPE: 15 HP 208/3/60

BUILDING NUMBERS

6942

FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 9: VARIABLE SPEED DRIVES FOR DUAL TEMPERATURE PUMPS

30 SEPTEMBER 1993

LOCATION: BLDG 6942
TYPE/SIZE: VERTICAL SPLIT CASE 15 HP
ELECTRICAL: 208 VOLT, 3 PHASE, 60 HERTZ

PAGE 1 OF 2

15 HORSEPOWER DUAL TEMPERATURE WATER PUMP ENERGY BASELINE

BIN	ANNUAL HOURLY OCCURRENCES	% FULL LOAD	MOTOR EFFICIENCY	ANNUAL ENERGY CONSUMPTION (MBTU/YR)
100/104	2	100	0.85	0
95/99	25	100	0.85	1
90/94	111	100	0.85	4
85/89	352	90	0.85	13
80/84	540	80	0.85	21
75/79	724	67	0.85	28
70/74	980	52	0.85	37
65/69	886	43	0.85	34
60/64	763	35	0.85	29
55/59	668	30	0.85	26
50/54	628	35	0.85	24
45/49	583	40	0.85	22
40/44	608	55	0.85	23
35/39	564	60	0.85	22
30/34	538	65	0.85	21
25/29	358	75	0.85	14
20/24	212	85	0.85	8
15/19	109	95	0.85	4
10/14	50	100	0.85	2
05/09	29	100	0.85	1
00/04	22	100	0.85	1

DUAL TEMPERATURE WATER PUMP BASELINE ENERGY

334 MBTU

DUAL TEMPERATURE WATER PUMP BASELINE ENERGY AND DEMAND COST

\$3,927

ENERGY CONSUMPTION

334 MBTU

ENERGY COST

\$2,066

DEMAND COST

\$1,861

FORT CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY

ECO 9: VARIABLE SPEED DRIVES FOR DUAL TEMPERATURE PUMPS
30 SEPTEMBER 1993

LOCATION: BLDG 6942
TYPE/SIZE: VERTICAL SPLIT CASE 15 HP
ELECTRICAL: 208 VOLT, 3 PHASE, 60 HERTZ

PAGE 2 OF 2

15 HORSEPOWER DUAL TEMPERATURE WATER PUMP ENERGY BASELINE

BIN	ANNUAL HOURLY OCCURRENCES	% FULL LOAD	MOTOR EFFICIENCY	ANNUAL ENERGY CONSUMPTION (MBTU/YR)
100/104	2	100	0.85	0
95/90	25	100	0.85	1
90/84	111	100	0.85	4
85/80	352	90	0.85	11
80/84	540	80	0.85	13
75/70	724	67	0.85	12
70/74	980	52	0.85	10
65/69	886	43	0.85	6
60/64	763	35	0.85	4
55/59	668	30	0.85	2
50/54	628	35	0.85	3
45/49	583	40	0.85	4
40/44	608	55	0.85	7
35/39	564	60	0.85	8
30/34	538	65	0.85	9
25/29	358	75	0.85	8
20/24	212	85	0.85	6
15/19	109	95	0.85	4
10/14	50	100	0.85	2
05/09	29	100	0.85	1
00/04	22	100	0.85	1

DUAL TEMPERATURE WATER PUMP BASELINE ENERGY				115 MBTU
DUAL TEMPERATURE WATER PUMP BASELINE ENERGY AND DEMAND COST				\$1,958
ENERGY CONSUMPTION	115 MBTU	ENERGY CCST	\$711	DEMAND COST \$1,247
NET ENERGY CONSUMPTION	219 MBTU	NET SAVINGS		\$1,968

Tue 28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 09:34:23

TITLE PAGE

ENERGY SAVINGS OPPORTUNITY SURVY
FT CAMPBELL, KY
ECO-9: VARIABLE SPEED DRIVE BUILDING 6942

Contract No: 27-93-C-0096

Prepared By: Systems Corp
Estimator: Keith A. Derrington
Estimate Prep. Date: 09/30/93
Current UPB/CSI ID: ORL290

M - C A C E S E D I T I O N
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Release 4.20

CREW ID: ORL290

CURRENCY in DOLLARS

4-75
PROJECT ID: 6942E9

Tue 28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-9: VARIABLE SPEED DRIVE BUILDING 6942

TIME 09:34:23

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Tue 28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
 ECO-9: VARIABLE SPEED DRIVE BUILDING 6942
 1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 09:34:23

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL	QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16050 BASIC MATERIALS AND METHODS									
16111 5100 IMC BRANCH AND FEEDER CONDUIT EXPOSED CONDITION. ALL 1/2 IN AND 3/4 IN ELBOWS ASSUMED TO BE FIELD BENT									
CD=4 EL 5103 3/4 IN INC CONDUIT W/COUPLING	*** UNIT COSTS: ***			0.06	1.73	0.01	0.58	0.03	2.35
WC=1100	220.00 LF EELEF			13	382	2	128	6	517
16120 1700 600 VOLT FEEDER WIRE, SINGLE STR COPPER CONDUCTOR, PULLED IN COND									
CD=4 EL 1705 NO 6-TYPE THWN	*** UNIT COSTS: ***			9.56	288.26	1.29	187.00	9.35	485.90
WC=1100	0.06 MLF EELEF			1	17	0	11	1	29
16900 CONTROLS AND INSTRUMENTATION									
16920 1000 VARIABLE SPEED DRIVES									
CD=3 EL 1004 VARIABLE SPEED DRIVE 15 HP	*** UNIT COSTS: ***			20.00	660.20	2.58	4405.00	220.25	5288.03
WC=1100	1.00 EA EELEB			20	660	3	4,405	220	5,288
16920 2000 CONTROL CABLE									
CD=3 EL 2001 TWISTED PAIR WIRES 18 AWG	*** UNIT COSTS: ***			8.28	249.82	1.12	820.00	41.00	1111.94
WC=1100	0.20 MLF EELEF			2	50	0	164	8	222
16961 4000 PRESSURE									
CD=3 EL 4001 PRESSURE TRANSDUCER, ELECTRONIC	*** UNIT COSTS: ***			17.00	534.83	1.29	300.00	15.00	851.12
WC=1100	1.00 EA EPIPA			17	535	1	300	15	851
TOTAL DIVISION 16 ELECTRICAL				52	1,644	6	5,008	250	6,908
TOTAL FACILITY AA. ELECTRICAL				52	1,644	6	5,008	250	6,908

CREW ID: ORL290

CURRENCY in DOLLARS

 4-77
 PROJECT ID: 6942E9

Tue 28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
 ECO-9: VARIABLE SPEED DRIVE BUILDING 6942
 1. BUILDING TO THE 5 FOOT LINE / BA. MECHANICAL

TIME 09:34:23

DETAILED ESTIMATE

DETAIL PAGE 2

BASE BID

DIVISION 15 MECHANICAL	QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
15010 GENERAL PROVISIONS									
15049 VALVES									
CD=3 HV 1000 CAP OFF 3 WAY VALVES	*** UNIT COSTS: ***			1.00	29.83	0.00	0.00	0.00	29.83
WC=0900	80.00 HR MSPZZ			80	2,386	0	0	0	2,386
15050 BASIC MATERIALS AND METHODS									
15063 1000 COPPER PIPE AND FITTINGS									
CD=3 HV 1014 PRESSURE FITTING, 4" TO 8" PIPE	*** UNIT COSTS: ***			0.46	14.31	0.11	2.59	0.13	17.14
WC=0800 6" STEM	1.00 EA MPLUC			0	14	0	3	0	17
15100 1300 BALL VALVES									
CD=3 HV 1302 1/2" BALL VALVE	*** UNIT COSTS: ***			0.29	9.06	0.07	4.35	0.22	13.70
WC=0800	1.00 EA MPLUC			0	9	0	4	0	14
TOTAL DIVISION 15 MECHANICAL				81	2,410	0	7	0	2,417
TOTAL FACILITY BA. MECHANICAL				81	2,410	0	7	0	2,417
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE				133	4,054	6	5,015	251	9,325
TOTAL BASE BID				133	4,054	6	5,015	251	9,325
TOTAL ADDITIVE				0	0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY				133	4,054	6	5,015	251	9,325

* * * END OF DETAIL REPORT * * *

4-78

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 6942E9

Tue 28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-9: VARIABLE SPEED DRIVE BUILDING 6942

TIME 09:34:23

PROJECT NOTES

SUMMARY PAGE 1

PROJECT NOTES

ECO-9: VARIABLE SPEED CIRCULATION PUMPS

SCOPE OF WORK: EVALUATE USE OF VARIABLE SPEED DRIVES ON HEATING/COOLING
CIRCULATIONS PUMPS IN SELECTED BARRACKS.

Tue 28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
 ECO-9: VARIABLE SPEED DRIVE BUILDING 6942

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BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY		COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHR FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL	1.00 EA	6,908	10.0% 691	0.0% 0	7.5% 570	2.5% 204	0.0% 0	8,373	8373.00
BA	MECHANICAL	1.00 EA	2,417	10.0% 242	0.0% 0	7.5% 199	2.5% 71	0.0% 0	2,930	2929.85
BID ITEM TOTAL		1.00 EA	9,325	933	0	769	276	0	11,303	11302.85
TOTAL BASE BID			9,325	933	0	769	276	0	11,303	
TOTAL ADDITIVE			0	0	0	0	0	0	0	
TOTAL INCL ADD			9,325	933	0	769	276	0	11,303	

Tue 28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
 ECO-9: VARIABLE SPEED DRIVE BUILDING 6942

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PROJECT CWE SUMMARY

SUMMARY PAGE 3

ID	BID ITEM	QUANTITY	UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00	EA	11,303		11,303	11302.80
	TOTAL CURRENT CONTRACT COST			11,303	0	11,303	
	Cost Growth from 08/93 to 08/94 Index Values: 0000 0000	0.0%		0	0	0	
	ESCALATED CONTRACT COST			11,303	0	11,303	
	Government-Furnished Property			0		0	
	SUBTOTAL			11,303	0	11,303	
	Contingencies	10.0%		1,130	0	1,130	
	SUBTOTAL			12,433	0	12,433	
	SIOH (S&A)	5.0%		622	0	622	
	CURRENT WORKING ESTIMATE			13,055	0	13,055	
	Estimated Construction Time	365	Days				

CREW ID: ORL290

CURRENCY in DOLLARS

4-81
 PROJECT ID: 6942E9

Tue 28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-9: VARIABLE SPEED DRIVE BUILDING 6942

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CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 4

ID	CONTRACTOR	PM	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT	W/TX	AMOUNT	PCT	W/OH&P	SUBTOTAL
AA	GENERAL/PRIME		1.00	EA	133	4,054	6	5,265		9,325	100.0%	0	9,325
	TOTAL DIRECT				133	4,054	6	5,265		9,325	100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

4-82

PROJECT ID: 6942E9

Tue 28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-9: VARIABLE SPEED DRIVE BUILDING 6942

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CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PM	SUBTOTAL	*** OVERHEAD ***	AMOUNT	PCT	HOFC%	**** PROFIT ****	AMOUNT	PCT	BOND%	OTHR%	***** TOTAL CONTRACT *****	AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		9,325	933	10.0%	0.0		769	7.5%	2.5%	0.0%		11,303	100.0%		11302.85
	TOTAL OVERHEAD & PROFIT			933	10.0%			769	7.5%							

CREW ID: ORL290

CURRENCY in DOLLARS

4-83
PROJECT ID: 6942E9

Tue 28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-9: VARIABLE SPEED DRIVE BUILDING 6942

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CSI DIVISION SUMMARY

SUMMARY PAGE 6

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
15 MECHANICAL	81	2,410	0	7	0	2,417
16 ELECTRICAL	52	1,644	6	5,008	250	6,908
TOTAL DIRECT	133	4,054	6	5,015	251	9,325

CREW ID: ORL290

CURRENCY in DOLLARS

4-84
PROJECT ID: 6942E9

Tue 28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-9: VARIABLE SPEED DRIVE BUILDING 6942

TIME 09:34:23

SYSTEMS SUMMARY

SUMMARY PAGE 7

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
08 PLUMBING	1	23	0	7	0	31
09 HEATING, VENTILATION & AIR CONDIT	80	2,386	0	0	0	2,386
11 INTERIOR ELECTRICAL	52	1,644	6	5,008	250	6,908
TOTAL DIRECT	133	4,054	6	5,015	251	9,325

CREW ID: ORL290

CURRENCY in DOLLARS

4-85
PROJECT ID: 6942E9

Tue 28 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-9: VARIABLE SPEED DRIVE BUILDING 6942

TIME 09:34:23

EQUIPMENT SUMMARY

SUMMARY PAGE 8

----- *** BOOK VALUE *** ADJ FACTOR ADJUSTD BOOK OP -- HRLY --- UPB **** TOTAL ****														
EQUIP DESCRIPTION	LIFE HRS	TL	HRLY	OWNRSH	OWNS	OVTM	OWNRSH	EXPENSE	RATE	RATE	HOURS	COST		

EMI20 SMALL TOOLS									1.40	1.40	4	6		

TOTAL PROJECT EQUIPMENT HOURS													4	6

Tue 28 Sep 1993

LABOR SUMMARY

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-9: VARIABLE SPEED DRIVE BUILDING 6942

TIME 09:34:23

SUMMARY PAGE 9

CRAFT	DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC	ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	44	1,406
LPLUM	PLUMBERS	21.25	0.0%	24.0%	4.50	0.00	30.85	25.55	1	23
LSPFI	STEAM/PIPEFITTERS	20.95	0.0%	24.0%	3.85	0.00	29.83	26.12	88	2,625
TOTAL PROJECT MANHOURS									133	4,055

* * * END OF SUMMARY REPORT * * *

CREW ID: ORL290

CURRENCY in DOLLARS

4-87
PROJECT ID: 6942E9

SUMMARY SHEET

BLOG #

80

$$\text{NATURAL GAS SAVINGS} = \frac{223}{\text{YR}} \text{ MBTU} * \$ \frac{4.00}{\text{MBTU}} = \$ 892$$

$$\text{ELECTRICAL SAVINGS} = \frac{510}{\text{YR}} \text{ MBTU} * \$ \frac{6.19}{\text{MBTU}} = \$ 3157$$

$$\text{TOTAL SAVINGS} = \$ 4049 / \text{YR}$$

HARDWARE REQUIRED:

<u>QUANTITY</u>	<u>ITEM</u>
<u>1</u>	FID/MUX
<u>3</u>	MUX ONLY
<u>12</u>	SPACE TEMP SENSOR
<u>4</u>	DUCT TEMP SENSOR
<u>4</u>	WATER TEMP SENSOR
<u>5</u>	D.A. TEMP SENSOR
<u>5</u>	HUMIDITY SENSOR
<u>1</u>	START/STOP
<u>5</u>	STATUS RELAY
<u>1</u>	DIFF. PRESSURE (DUCT)
<u>2</u>	DIFF. PRESSURE (PIPE)
<u>2</u>	FLOW SWITCH
<u>1</u>	PRESSURE SWITCH
<u>3</u>	CURRENT RELAY
<u>1</u>	DATA TERMINAL CABINET
<u>1</u>	INSTRUMENT ENCLOSURE
<u>800</u>	FT. - 2 WIRE, TWISTED PAIR, #18 CONTROL WIRE
<u>400</u>	FT. - RIGID CONDUIT - 1" D.
<u>7</u>	JUNCTION BOXES
<u>35</u>	PROGRAMMING POINTS
<u>200</u>	FT. - POWER WIRING

Title	ECO-10 - EMCS ADDITIONS	Checked By	Date
	SUMMARY SHEET	GBL	9-17-93
	Project FT. CAMPBELL ENERGY SAVINGS	Prepared By	Sheet No.
		GBL	
		Job No.	5-1

BASELINE ENERGY USAGE

BLDG #

8011

HEATING: DEGREE DAY METHOD

$$\text{HEATING ENERGY (BTU/YR)} = \frac{24 * DD * \dot{q}}{\eta * \Delta T} * C_D$$

WHERE: DD = DEGREE DAYS - °F-DAY

\dot{q} = BUILDING DESIGN HEAT LOAD - BTU/HR

η = HEATING SYSTEM EFFICIENCY

$\Delta T = (T_{\text{INDOORS}} - T_{\text{OUTSIDE}})_{\text{DESIGN}} = (68 - 4)^\circ\text{F}$

C_D = CORRECTION FACTOR BASED ON 65° DD

$$\text{HEATING ENERGY} = \frac{\left(24 \frac{\text{HR}}{\text{DAY}}\right) (4290^\circ\text{F-DAY}) \left(1.2 \times 10^6 \frac{\text{BTU}}{\text{HR}}\right)}{(0.65) (68 - 4)^\circ\text{F}} (0.6)$$

$$\text{ENERGY} = \underline{1782 \times 10^6} \frac{\text{BTU}}{\text{YR}} \text{ (NATURAL GAS)}$$

AUXILIARY EQUIPMENT:

SUPPLY @ 15, RETURN @ 5 HP

$$\text{FANS: ENERGY} = \text{FAN HP} * 2545 \frac{\text{BTU}}{\text{HR} \cdot \text{HP}} * \text{DIVERSITY FACTOR} * \frac{\text{HEATING HRS}}{\text{YR}}$$

$$\text{ENERGY} = \underline{20} * 2545 * \underline{1.0} * 4369 = \underline{222 \times 10^6} \frac{\text{BTU}}{\text{YR}} \text{ (ELEC)}$$

PUMPS:

$$\text{ENERGY} = \text{PUMP HP} * 2545 \frac{\text{BTU}}{\text{HR} \cdot \text{HP}} * \text{DIVERSITY FACTOR} * \frac{\text{Htg HRS}}{\text{YR}}$$

$$\text{ENERGY} = \underline{5} * 2545 * \underline{1.0} * 4369 = \underline{56 \times 10^6} \frac{\text{BTU}}{\text{YR}} \text{ (ELEC)}$$

$$\text{TOTAL BASELINE HEATING ENERGY} = \underline{2060 \times 10^6} \frac{\text{BTU}}{\text{YR}}$$

Title	ECO-10 - EMCS ADDITIONS BASELINE ENERGY USAGE	Checked By	Date
		GEL	7-16-93
Project	FT. CAMPBELL ENERGY SAVINGS PROFESSIONAL SURVEY	Prepared By	Sheet No.
		GEL	B-1

BASELINE ENERGY USAGE

BLDG #
80

COOLING - BIN METHOD

<u>BIN</u>	<u>HRS/YR</u>	<u>% FULL LOAD</u>	<u>FULL LOAD BTU / HR</u>	<u>BTU / YR</u>
95/99	3	* 1.0	* 480,000	= <u>1,440,000</u>
90/94	17	* 1.0	* 480,000	= <u>8,160,000</u>
85/89	75	* 0.85	* 480,000	= <u>30,600,000</u>
80/84	185	* 0.70	* 480,000	= <u>62,160,000</u>
75/79	407	* 0.55	* 480,000	= <u>107,448,000</u>
70/74	714	* 0.40	* 480,000	= <u>137,088,000</u>
65/69	673	* 0.25	* 480,000	= <u>80,760,000</u>

TOTAL
HRS/YR = 2074

TOTAL $\frac{BTU}{YR} = 427,656,000$

$$\begin{aligned} \text{TOTAL ELECTRICAL ENERGY INPUT COOLING} &= \frac{428 \times 10^6 \text{ BTU}}{YR} \div 2 \text{ (AVG. C.O.P.)} \\ &= \underline{214 \times 10^6 \text{ BTU/YR (ELEC)}} \end{aligned}$$

NOTE : HRS/YR INDICATE THE TOTAL ANNUAL OCCURRENCES IN EACH BIN FOR THE HOURS FROM 5 P.M. TO 3 A.M.

AUXILIARIES :

20 HP IN FAN, 15 HP C.W. PUMP

$$\text{FANS : } \underline{35} \text{ HP} \approx 2545 \frac{\text{BTU}}{\text{HP HR}} \times 1.0 \times 2074 = \underline{185 \times 10^6 \frac{\text{BTU}}{YR} \text{ (ELEC)}}$$

FOR THE HOURS FROM 5 P.M. TO 3 A.M.:

$$\begin{aligned} \text{TOTAL BASELINE COOLING ENERGY} &= \underline{399 \times 10^6 \frac{\text{BTU}}{YR} \text{ (ELEC)}} \\ \text{THIS IS ALSO THE PROPOSED COOLING ENERGY SAVINGS} & \\ \text{FOR IMPLEMENTING THIS ECO} & \end{aligned}$$

Project	Title	ECO-10 - EMCS ADDITIONS	Checked By	GBL	Date	9-21-93
		BASELINE COOLING ENERGY	Prepared By	GBL	Sheet No.	2-7
		WAT CAMPBELL ENERGY SAVINGS	Job No.			

PROPOSED ENERGY USAGE

BLDG #
80

HEATING: DEGREE DAY METHOD

SEE SHEET (B-1) FOR DEGREE DAY FORMULA EXPLANATION.
BY LOWERING SPACE HEATING SETPOINTS DURING UNOCCUPIED
HOURS WITH THE ENERGY MANAGEMENT AND CONTROL SYSTEM
(EMCS), THE FOLLOWING SAVINGS ARE ACHIEVED:

$$\text{EXISTING DESIGN } \Delta T = (68 - 4) = 4^{\circ}\text{F}$$

$$\text{PROPOSED SETBACK } \Delta T = (-4) = 0^{\circ}\text{F}$$

$$\begin{aligned} \text{SETBACK BUILDING HEAT LOAD} &= \frac{\text{DESIGN HEAT LOAD}}{\text{DESIGN } \Delta T} * \text{PROPOSED } \Delta T \\ &= \frac{(1.2 \times 10^6) \frac{\text{BTU}}{\text{HR}}}{(68 - 4)^{\circ}\text{F}} * (50 - 4)^{\circ}\text{F} \end{aligned}$$

$$\text{SETBACK BUILDING HEAT LOAD} = 0.9 \times 10^6 \frac{\text{BTU}}{\text{HR}}$$

NOW USING THE DEGREE-DAY FORMULA FOR THE PROPOSED SETBACK CONDITION:

$$\begin{aligned} \text{PROPOSED HEATING ENERGY USAGE} &= \frac{\left(\frac{\text{SETBACK HRS}}{\text{DAY}} \right) (4290^{\circ}\text{F-DAY}) \left(\frac{\text{SETBACK BUILDING HT. LOAD}}{\text{HT. LOAD}} \right)}{n (68 - 4)^{\circ}\text{F}} (0.6) + \frac{\left(24 - \frac{\text{SETBACK HRS}}{\text{DAY}} \right) (\text{BASELINE HEATING ENERGY})}{24 \frac{\text{HR}}{\text{DAY}}} \\ &= \frac{(12 \text{ HRS}) 4290 \left(0.9 \times 10^6 \frac{\text{BTU}}{\text{HR}} \right)}{(0.65) (64)} (0.6) + \frac{(24 - 12) (1782 \times 10^6)}{24} \end{aligned}$$

$$\text{PROPOSED HEATING ENERGY USAGE} = 1559 \times 10^6 \frac{\text{BTU}}{\text{YR}} (\text{NATURAL GAS})$$

$$\text{AUXILIARY ENERGY SAVINGS} = \text{BASELINE AUX. ENERGY} - \text{PROPOSED AUX. ENERGY}$$

$$\text{AUX. ENRG. SAVINGS} = 278 \times 10^6 \frac{\text{BTU}}{\text{YR}} \left(\text{FROM SHEET B-1} \right) - \left[25 \text{ HP} * 2545 * 0.6 \left(\frac{\text{DIV. FACTOR}}{\text{FACT}} \right) * 4369 \right]$$

$$\text{AUX. ENERGY SAVINGS} = 111 \times 10^6 \frac{\text{BTU}}{\text{YR}} (\text{ELEC}) \quad \text{TOTAL ENERGY SAVINGS} = 334 \times 10^6 \frac{\text{BTU}}{\text{YR}}$$

Title	ECO-10 - EMCS ADDITIONS	Checked By	GBL	Date	9-16-93
	PROPOSED ENERGY USAGE	Prepared By	GBL	Sheet No.	
Project	FT. CAMPBELL ENERGY SAVINGS	Job No.			E-1

Fri 24 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 11:52:41

TITLE PAGE

ENERGY SAVINGS OPPORTUNITY SURVY
FT CAMPBELL, KY
ECO-10: BUILDING 80

Contract No: 27-93-C-0096

Prepared By: Systems Corp
Estimator: Keith A. Derrington
Estimate Prep. Date: 09/30/93
Current UPB/CSI ID: ORL290

M - C A C E S E D I T I O N
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Release 4.20

CREW ID: ORL290

CURRENCY in DOLLARS

4-92
PROJECT ID: 080E10

Fri 24 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-10: BUILDING 80

TIME 11:52:41

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DETAILED ESTIMATE DETAIL PAGE

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Fri 24 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-10: BUILDING 80
1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 11:52:41

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL	QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16050 BASIC MATERIALS AND METHODS									
16111 1100 RIGID GALVANIZED STEEL CONDUIT									
CD=4 EL 1121 1 IN CONDUIT W/COUPLING	*** UNIT COSTS: ***			0.08	2.34	0.01	0.90	0.05	3.30
WC=1100	400.00 LF EELEF			31	937	4	360	18	1,319
16120 1200 SINGLE STRANDED CONDUCTOR									
CD=4 EL 1211 NO. 12 AWG - TYPE THHN	*** UNIT COSTS: ***			5.78	174.30	0.78	52.98	2.65	230.71
WC=1100 INSULATION	0.20 MLF EELEF			1	35	0	11	1	46
16130 1200 NEMA 1 SCREW COVER ENCL									
CD=4 EL 1202 6X6X4 NEMA 1	*** UNIT COSTS: ***			0.67	22.01	0.09	4.87	0.24	27.21
WC=1100	7.00 EA EELEB			5	154	1	34	2	190
16900 CONTROLS AND INSTRUMENTATION									
16920 2000 CONTROL CABLE									
CD=3 EL 2001 TWISTED PAIR WIRES 18 AWG	*** UNIT COSTS: ***			8.28	249.82	1.12	820.00	41.00	1111.94
WC=1100	0.80 MLF EELEF			7	200	1	656	33	890
16920 3000 CONTROL SWITCH									
CD=3 EL 3001 START/STOP	*** UNIT COSTS: ***			5.00	165.05	0.65	60.00	3.00	228.70
WC=1100	5.00 EA EELEB			25	825	3	300	15	1,143
16920 4000 RELAY									
CD=3 EL 4001 STATUS RELAY	*** UNIT COSTS: ***			1.25	41.26	0.16	20.00	1.00	62.42
WC=1100	5.00 EA EELEB			6	206	1	100	5	312
CD=3 EL 4002 CURRENT RELAY	*** UNIT COSTS: ***			1.25	41.26	0.16	85.00	4.25	130.67
WC=1100	3.00 EA EELEB			4	124	0	255	13	392
16961 3000 TEMPERATURE									
CD=3 EL 3001 SPACE TEMPERATURE SENSOR	*** UNIT COSTS: ***			2.50	82.53	0.32	40.00	2.00	124.85
WC=1100	3.00 EA EELEB			8	248	1	120	6	375
CD=3 EL 3002 DUCT TEMPERATURE SENSOR	*** UNIT COSTS: ***			2.00	62.79	1.40	45.00	2.25	111.44
WC=1100	12.00 EA EESMA			24	753	17	540	27	1,337
CD=3 EL 3004 PIPE TEMPERATURE SENSOR	*** UNIT COSTS: ***			4.25	133.71	0.32	60.00	3.00	197.03
WC=1100	4.00 EA EPIPA			17	535	1	240	12	788

CREW ID: ORL290

CURRENCY in DOLLARS

4-94
PROJECT ID: 080E10

Fri 24 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-10: BUILDING 80
1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 11:52:41

DETAILED ESTIMATE

DETAIL PAGE 2

BASE BID

DIVISION 16 ELECTRICAL		QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$

16961 4000 PRESSURE										
CD=3 EL 4002	DUCT DIFFERENTIAL PRESSURE	*** UNIT COSTS: ***			2.00	62.79	1.40	35.00	1.75	100.94
WC=1100	SENSOR	1.00 EA EESMA		2	63		1	35	2	101
CD=3 EL 4003	PUMP DIFFERENTIAL PRESSURE	*** UNIT COSTS: ***			8.50	267.42	0.65	85.00	4.25	357.31
WC=1100	SENSOR	2.00 EA EPIPA		17	535		1	170	9	715
16962 PRESSURE SWITCHES										
CD=3 EL 1001	PRESSURE SWITCH	*** UNIT COSTS: ***			2.00	62.79	1.40	80.00	4.00	148.19
WC=1100		1.00 EA EESMA		2	63		1	80	4	148
16963 FLOW SWITCHES										
CD=3 EL 1001	FLOW SWITCH	*** UNIT COSTS: ***			2.50	82.53	0.32	190.00	9.50	282.35
WC=1100		2.00 EA EELEB		5	165		1	380	19	565
CD=3 EL 1002	FLOW SWITCH	*** UNIT COSTS: ***			5.00	137.72	2.02	0.00	0.00	139.73
WC=1100		2.00 EA MSPFB		10	275		4	0	0	279
16991 5000 MUX										
CD=3 EL 5001	MUX	*** UNIT COSTS: ***			5.00	165.05	0.65	4720.00	236.00	5121.70
WC=1100		1.00 EA EELEB		5	165		1	4,720	236	5,122
16991 6000 CABINET										
CD=3 EL 6001	DATA TERMINAL CABINET	*** UNIT COSTS: ***			2.50	82.53	0.32	350.00	17.50	450.35
WC=1100		1.00 EA EELEB		3	83		0	350	18	450
CD=3 EL 6002	INSTRUMENT SHELTER	*** UNIT COSTS: ***			2.50	82.53	0.32	125.00	6.25	214.10
WC=1100		1.00 EA EELEB		3	83		0	125	6	214
16991 7000 SOFTWARE										
CD=3 EL 7001	PROGRAMMING POINTS FOR EMCS	*** UNIT COSTS: ***			1.25	41.26	0.16	30.00	1.50	72.92
WC=1100		35.00 EA EELEB		44	1,444		6	1,050	53	2,552
TOTAL DIVISION 16 ELECTRICAL					217	6,892	45	9,526	476	16,939
TOTAL FACILITY AA. ELECTRICAL					217	6,892	45	9,526	476	16,939
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE					217	6,892	45	9,526	476	16,939
TOTAL BASE BID					217	6,892	45	9,526	476	16,939

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 080E10

4-95

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U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-10: BUILDING 80
2. SITEWORK /

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DETAILED ESTIMATE

DETAIL PAGE 3

BASE BID

DIVISION 16 ELECTRICAL

QUANTITY UOM CREW

MANHR

LABOR

EQUIPMENT

MATERIAL

SALESTX

DIRECT \$

TOTAL ADDITIVE

0 0 0 0 0 0

TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY

217 6,892 45 9,526 476 16,939

* * * END OF DETAIL REPORT * * *

CREW ID: ORL290

CURRENCY in DOLLARS

4-96
PROJECT ID: 080E10

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PROJECT NOTES

SUMMARY PAGE 1

PROJECT NOTES

ECO-10: EMCS EXPANSION

SCOPE OF WORK: EVALUATE THE EXPANSION OF THE EXISTING EMCS SYSTEM TO SELECTED
FACILITIES AT FORT CAMPBELL.

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BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY		COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHER	FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL			10.0%	0.0%	7.5%	2.5%	0.0%			
		1.00 EA	16,939	1,694	0	1,397	501	0		20,531	20531.30
BID ITEM TOTAL		1.00 EA	16,939	1,694	0	1,397	501	0		20,531	20531.30

CREW ID: ORL290

CURRENCY in DOLLARS

4-98
PROJECT ID: 080E10

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U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
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BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 3

BID ITEM 2 SITEWORK

BASE BID

ID FACILITY	COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHR FCTR	TOTAL COST	UNIT COST
TOTAL BASE BID	16,939	1,694	0	1,397	501	0	20,531	
TOTAL ADDITIVE	0	0	0	0	0	0	0	
TOTAL INCL ADD	16,939	1,694	0	1,397	501	0	20,531	

CREW ID: ORL290

CURRENCY in DOLLARS

4-99

PROJECT ID: 080E10

Fri 24 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
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PROJECT CWE SUMMARY

SUMMARY PAGE 4

ID	BID ITEM	QUANTITY UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00 EA	20,531		20,531	20531.30
	TOTAL CURRENT CONTRACT COST		20,531	0	20,531	
	Cost Growth from 09/93 to 09/94 Index Values: 0000 0000	0.0%	0	0	0	
	ESCALATED CONTRACT COST		20,531	0	20,531	
	Government-Furnished Property		0		0	
	SUBTOTAL		20,531	0	20,531	
	Contingencies	10.0%	2,053	0	2,053	
	SUBTOTAL		22,584	0	22,584	
	SIOH (S&A)	5.0%	1,129	0	1,129	
	CURRENT WORKING ESTIMATE		23,714	0	23,714	

Estimated Construction Time 365 Days

CREW ID: ORL290

CURRENCY in DOLLARS

4-100
PROJECT ID: 080E10

Fri 24 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
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CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PM	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT	W/TX	** TOTAL DIRECT **	* SUBCON *	W/OH&P	SUBTOTAL
										AMOUNT	PCT		
AA	GENERAL/PRIME		1.00	EA	217	6,892	45	10,002		16,939	100.0%	0	16,939
	TOTAL DIRECT				217	6,892	45	10,002		16,939	100.0%		

CREW ID: ORL290

CURRENCY in DOLLARS

4-101
PROJECT ID: 080E10

Fri 24 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-10: BUILDING 80

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CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 6

ID	CONTRACTOR	PM	SUBTOTAL	*** OVERHEAD ***	AMOUNT	PCT	HOFC%	**** PROFIT ****	AMOUNT	PCT	BOND%	OTHER%	***** TOTAL CONTRACT *****	AMOUNT	PCT	UNIT COST
AA	GENERAL/PRIME		16,939	1,694	10.0%	0.0		1,397	7.5%	2.5%	0.0%		20,531	100.0%		20531.27
	TOTAL OVERHEAD & PROFIT			1,694	10.0%			1,397	7.5%							

CREW ID: ORL290

CURRENCY in DOLLARS

4-102
PROJECT ID: 080E10

Fri 24 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-10: BUILDING 80

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CSI DIVISION SUMMARY

SUMMARY PAGE 7

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	217	6,892	45	9,526	476	16,939
TOTAL DIRECT	217	6,892	45	9,526	476	16,939

CREW ID: ORL290

CURRENCY in DOLLARS

4-103
PROJECT ID: 080E10

Fri 24 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-10: BUILDING 80

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SYSTEMS SUMMARY

SUMMARY PAGE 8

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	217	6,892	45	9,526	476	16,939
TOTAL DIRECT	217	6,892	45	9,526	476	16,939

CREW ID: ORL290

CURRENCY in DOLLARS

4-104
PROJECT ID: 080E10

Fri 24 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
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EQUIPMENT SUMMARY

SUMMARY PAGE 9

EQUIP DESCRIPTION	LIFE HRS	TL HRLY	OWNRSH	OWNS	OVTM	OWNRSH	EXPENSE	HRLY RATE	UPB RATE	HOURS	TOTAL COST
EMI20 SMALL TOOLS								1.40	1.40	32	45
TOTAL PROJECT EQUIPMENT HOURS										32	45

Fri 24 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-10: BUILDING 80

TIME 11:52:41

LABOR SUMMARY

SUMMARY PAGE 10

CRAFT DESCRIPTION	BASE	OVERTH	TAX/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	177	5,722
LSHMT SHEET METAL WORKERS	19.90	0.0%	24.0%	5.20	0.00	29.88	25.06	14	418
LSPFI STEAM/PIPEFITTERS	20.95	0.0%	24.0%	3.85	0.00	29.83	26.12	26	753
TOTAL PROJECT MANHOURS								217	6,893

* * * END OF SUMMARY REPORT * * *

SUMMARY SHEET

BLDG #

2702

$$\text{NATURAL GAS SAVINGS} = \frac{297 \text{ MBTU}}{\text{YR}} \times \$ \frac{4.00}{\text{MBTU}} = \$ \underline{1188}$$

$$\text{ELECTRICAL SAVINGS} = \frac{942 \text{ MBTU}}{\text{YR}} \times \$ \frac{6.19}{\text{MBTU}} = \$ \underline{5831}$$

$$\text{TOTAL SAVINGS} = \$ \underline{7019} / \text{YR}$$

HARDWARE REQUIRED:

<u>QUANTITY</u>	<u>ITEM</u>
—	FID/MUX
—	MUX ONLY
—	SPACE TEMP SENSOR
<u>12</u>	DUCT TEMP SENSOR
<u>2</u>	WATER TEMP SENSOR
—	D.A. TEMP SENSOR
—	HUMIDITY SENSOR
<u>5</u>	START/STOP
<u>5</u>	STATUS RELAY
<u>3</u>	DIFF. PRESSURE (DUCT)
<u>1</u>	DIFF. PRESSURE (PIPE)
<u>1</u>	FLOW SWITCH
<u>3</u>	PRESSURE SWITCH
<u>5</u>	CURRENT RELAY
<u>1</u>	DATA TERMINAL CABINET
<u>1</u>	INSTRUMENT ENCLOSURE
<u>1000</u> FT.	— 2 WIRE, TWISTED PAIR, #18 CONTROL WIRE
<u>500</u> FT.	— RIGID CONDUIT - 1" D.
<u>6</u>	JUNCTION BOXES
<u>32</u>	PROGRAMMING POINTS
<u>200</u> FT.	— POWER WIRING

Title ECO-10 - EMCS ADDITIONS
SUMMARY SHEET

Checked By GBL

Date 9-17-93

Project FT. CAMPBELL ENERGY SAVINGS
ADDITIONALITY SURVEY

Prepared By GBL

Sheet No.

Job No. 02-11-11

G-1

BASELINE ENERGY USAGE

BLDG #

2702

HEATING: DEGREE DAY METHOD

$$\text{HEATING ENERGY (BTU/YR)} = \frac{24 * DD * \dot{q}}{\eta * \Delta T} * C_D$$

WHERE: DD = DEGREE DAYS - °F-DAY

\dot{q} = BUILDING DESIGN HEAT LOAD - BTU/HR

η = HEATING SYSTEM EFFICIENCY

$\Delta T = (T_{\text{INDOORS}} - T_{\text{OUTSIDE}})_{\text{DESIGN}} = (68 - 4)^\circ\text{F}$

C_D = CORRECTION FACTOR BASED ON 65° DD

$$\text{HEATING ENERGY} = \frac{\left(24 \frac{\text{HR}}{\text{DAY}}\right) (4290^\circ\text{F-DAY}) \left(1.4 \times 10^6 \frac{\text{BTU}}{\text{HR}}\right)}{(0.45) (68 - 4)^\circ\text{F}} (0.6)$$

$$\text{ENERGY} = \underline{2079 \times 10^6} \frac{\text{BTU}}{\text{YR}} \text{ (NATURAL GAS)}$$

AUXILIARY EQUIPMENT:

FANS: $\text{ENERGY} = \text{FAN HP} * 2545 \frac{\text{BTU}}{\text{HR} \cdot \text{HP}} * \text{DIVERSITY FACTOR} * \frac{\text{HEATING HRS}}{\text{YR}}$

$$\text{ENERGY} = \underline{56} * 2545 * \underline{1.0} * 4369 = \underline{623 \times 10^6} \frac{\text{BTU}}{\text{YR}} \text{ (ELEC)}$$

PUMPS:

$$\text{ENERGY} = \text{PUMP HP} * 2545 \frac{\text{BTU}}{\text{HR} \cdot \text{HP}} * \text{DIVERSITY FACTOR} * \frac{\text{Htg HRS}}{\text{YR}}$$

$$\text{ENERGY} = \underline{5} * 2545 * 1.0 * 4369 = \underline{56 \times 10^6} \frac{\text{BTU}}{\text{YR}} \text{ (ELEC)}$$

$$\text{TOTAL BASELINE HEATING ENERGY} = \underline{2758 \times 10^6} \frac{\text{BTU}}{\text{YR}}$$

Title	ECO-10 - EMCS ADDITIONS	Checked By	GBL	Date	4-108
	BASELINE ENERGY USAGE	Prepared By	GBL	7-16-93	
	Project	Job No.	93006.01	Sheet No.	
	FT. CAMPBELL ENERGY SAVINGS OPPORTUNITY SURVEY			B-1	

BASELINE ENERGY USAGE

BLDG #

2702

COOLING - BIN METHOD

70 TONS TOTAL

<u>BIN</u>	<u>HRS/YR</u>	<u>% FULL LOAD</u>	<u>FULL LOAD BTU/HR</u>	<u>BTU/YR</u>
95/99	3	* 1.0	* 840,000	= <u>2,520,000</u>
90/94	17	* 1.0	* 840,000	= <u>14,280,000</u>
85/89	75	* 0.85	* 840,000	= <u>53,550,000</u>
80/84	185	* 0.70	* 840,000	= <u>108,780,000</u>
75/79	407	* 0.55	* 840,000	= <u>188,034,000</u>
70/74	714	* 0.40	* 840,000	= <u>239,904,000</u>
65/69	673	* 0.25	* 840,000	= <u>141,330,000</u>

TOTAL
HRS/YR = 2074

TOTAL $\frac{BTU}{YR} = 748,398,000$

$$\begin{aligned} \text{TOTAL ELECTRICAL ENERGY INPUT COOLING} &= \frac{748 \times 10^6 \text{ BTU}}{YR} \div 2 \text{ (AVG. C.O.P.)} \\ &= \underline{374 \times 10^6 \text{ BTU/YR (ELEC)}} \end{aligned}$$

NOTE : HRS/YR INDICATE THE TOTAL ANNUAL OCCURRENCES IN EACH BIN FOR THE HOURS FROM 5 P.M. TO 8 A.M.

AUXILIARIES :

$$\text{FANS : } 56 \text{ HP} \times 2545 \frac{\text{BTU}}{\text{HP HR}} \times 1.0 \times 2074 = \underline{296 \times 10^6 \frac{\text{BTU}}{YR} \text{ (ELEC)}}$$

FOR THE HOURS FROM 5 P.M. TO 8 A.M.:

$$\begin{aligned} \text{TOTAL BASELINE COOLING ENERGY} &= \underline{670 \times 10^6 \frac{\text{BTU}}{YR} \text{ (ELEC)}} \\ \text{THIS IS ALSO THE PROPOSED COOLING ENERGY SAVINGS} & \\ \text{FOR IMPLEMENTING THIS ECO} & \end{aligned}$$

Title	ECO-10 - EMCS ADDITIONS	Checked By	GBL	Date	9-21-93
	BASELINE COOLING ENERGY	Prepared By	GBL	Sheet No.	
	Project	Job No.	2702	2-7	

PROPOSED ENERGY USAGE

BLDG #
2702

HEATING: DEGREE DAY METHOD

SEE SHEET (B-1) FOR DEGREE DAY FORMULA EXPLANATION.
BY LOWERING SPACE HEATING SETPOINTS DURING UNOCCUPIED
HOURS WITH THE ENERGY MANAGEMENT AND CONTROL SYSTEM
(EMCS), THE FOLLOWING SAVINGS ARE ACHIEVED:

$$\text{EXISTING DESIGN } \Delta T = (68 - 4) = 4^{\circ}\text{F}$$

$$\text{PROPOSED SETBACK } \Delta T = (-4) = 0^{\circ}\text{F}$$

$$\begin{aligned} \text{SETBACK BUILDING HEAT LOAD} &= \frac{\text{DESIGN HEAT LOAD}}{\text{DESIGN } \Delta T} * \text{PROPOSED } \Delta T \\ &= \frac{(1.4 \times 10^6) \frac{\text{BTU}}{\text{HR}}}{(68 - 4)^{\circ}\text{F}} * (50 - 4)^{\circ}\text{F} \end{aligned}$$

$$\text{SETBACK BUILDING HEAT LOAD} = 1.0 \times 10^6 \frac{\text{BTU}}{\text{HR}}$$

NOW USING THE DEGREE-DAY FORMULA FOR THE PROPOSED SETBACK CONDITION:

$$\begin{aligned} \text{PROPOSED HEATING ENERGY USAGE} &= \frac{\left(\frac{\text{SETBACK HRS}}{\text{DAY}} \right) (4290^{\circ}\text{F-DAY}) \left(\frac{\text{SETBACK BUILDING HT. LOAD}}{\text{HT. LOAD}} \right)}{24 (68 - 4)^{\circ}\text{F}} (0.6) + \frac{\left(24 - \frac{\text{SETBACK HRS}}{\text{DAY}} \right) (\text{BASELINE HEATING ENERGY})}{24 \frac{\text{HR}}{\text{DAY}}} \\ &= \frac{(12 \text{ HRS}) 4290 (1.0 \times 10^6 \frac{\text{BTU}}{\text{HR}})}{(0.65) (64)} (0.6) + \frac{(24 - 12) (2079 \times 10^6)}{24} \end{aligned}$$

$$\text{PROPOSED HEATING ENERGY USAGE} = 1782 \times 10^6 \frac{\text{BTU}}{\text{YR}} (\text{NATURAL GAS})$$

AUXILIARY ENERGY SAVINGS = BASELINE AUX. ENERGY - PROPOSED AUX. ENERGY

$$\text{AUX. ENRG. SAVINGS} = 679 \times 10^6 \frac{\text{BTU}}{\text{YR}} (\text{FROM SHEET B-1}) - \left[61 \text{ HP} * 2545 * 0.6 (\text{DIV. FACTOR}) * 4369 \right]$$

$$\text{AUX. ENERGY SAVINGS} = 272 \times 10^6 \frac{\text{BTU}}{\text{YR}} (\text{ELEC}) \quad \text{TOTAL ENERGY SAVINGS} = 569 \times 10^6 \frac{\text{BTU}}{\text{YR}}$$

Title	ECO-10 - EMCS ADDITIONS	Checked By	GBL	Date	9-16-93
	PROPOSED ENERGY USAGE	Prepared By	GBL	Sheet No.	
Project	FT. CAMPBELL ENERGY SAVINGS	Job No.	92-001-01	F-1	

Fri 24 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES

TIME 10:44:11

TITLE PAGE

ENERGY SAVINGS OPPORTUNITY SURVY
FT CAMPBELL, KY
ECO-10: BUILDING 2702

Contract No: 27-93-C-0096

Prepared By: Systems Corp
Estimator: Keith A. Derrington
Estimate Prep. Date: 09/30/93
Current UPB/CSI ID: ORL290

M - C A C E S E D I T I O N
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Release 4.20

CREW ID: ORL290

CURRENCY in DOLLARS

4-111
PROJECT ID: 270210

Fri 24 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-10: BUILDING 2702

TIME 10:44:11

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DETAILED ESTIMATE	DETAIL PAGE
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AA. ELECTRICAL.....	1

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Fri 24 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
 ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
 ECO-10: BUILDING 2702
 1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 10:44:11

DETAILED ESTIMATE

DETAIL PAGE 1

BASE BID

DIVISION 16 ELECTRICAL

QUANTITY UOM CREW MANHR LABOR EQUIPMENT MATERIAL SALESTX DIRECT \$

16050 BASIC MATERIALS AND METHODS

16111 1100 RIGID GALVANIZED STEEL CONDUIT

CD=4 EL 1121 1 IN CONDUIT W/COUPLING
 WC=1100

*** UNIT COSTS: *** 0.08 2.34 0.01 0.90 0.05 3.30
 500.00 LF EELEF 39 1,171 5 450 23 1,649

16120 1200 SINGLE STRANDED CONDUCTOR

CD=4 EL 1211 NO. 12 AWG - TYPE THHN
 WC=1100 INSULATION

*** UNIT COSTS: *** 5.78 174.30 0.78 52.98 2.65 230.71
 0.20 MLF EELEF 1 35 0 11 1 46

16130 1200 NEMA 1 SCREW COVER ENCL

CD=4 EL 1202 6X6X4 NEMA 1
 WC=1100

*** UNIT COSTS: *** 0.67 22.01 0.09 4.87 0.24 27.21
 6.00 EA EELEB 4 132 1 29 1 163

16900 CONTROLS AND INSTRUMENTATION

16920 2000 CONTROL CABLE

CD=3 EL 2001 TWISTED PAIR WIRES 18 AWG
 WC=1100

*** UNIT COSTS: *** 8.28 249.82 1.12 820.00 41.00 1111.94
 1.00 MLF EELEF 8 250 1 820 41 1,112

16920 3000 CONTROL SWITCH

CD=3 EL 3001 START/STOP
 WC=1100

*** UNIT COSTS: *** 5.00 165.05 0.65 60.00 3.00 228.70
 5.00 EA EELEB 25 825 3 300 15 1,143

16920 4000 RELAY

CD=3 EL 4001 STATUS RELAY
 WC=1100

*** UNIT COSTS: *** 1.25 41.26 0.16 20.00 1.00 62.42
 5.00 EA EELEB 6 206 1 100 5 312

CD=3 EL 4002 CURRENT RELAY
 WC=1100

*** UNIT COSTS: *** 1.25 41.26 0.16 85.00 4.25 130.67
 5.00 EA EELEB 6 206 1 425 21 653

16961 3000 TEMPERATURE

CD=3 EL 3002 DUCT TEMPERATURE SENSOR
 WC=1100

*** UNIT COSTS: *** 2.00 62.79 1.40 45.00 2.25 111.44
 12.00 EA EESMA 24 753 17 540 27 1,337

CD=3 EL 3004 PIPE TEMPERATURE SENSOR
 WC=1100

*** UNIT COSTS: *** 4.25 133.71 0.32 60.00 3.00 197.03
 2.00 EA EPIPA 9 267 1 120 6 394

16961 4000 PRESSURE

CD=3 EL 4002 DUCT DIFFERENTIAL PRESSURE
 WC=1100 SENSOR

*** UNIT COSTS: *** 2.00 62.79 1.40 35.00 1.75 100.94
 3.00 EA EESMA 6 188 4 105 5 303

4-113

CREW ID: ORL290

CURRENCY in DOLLARS

PROJECT ID: 270210

Fri 24 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-10: BUILDING 2702
1. BUILDING TO THE 5 FOOT LINE / AA. ELECTRICAL

TIME 10:44:11

DETAILED ESTIMATE

DETAIL PAGE 2

BASE BID

DIVISION 16 ELECTRICAL	QUANTITY	UOM	CREW	MANHR	LABOR	EQUIPMENT	MATERIAL	SALESTX	DIRECT \$
16961 4000 PRESSURE									
CD=3 EL 4003 PUMP DIFFERENTIAL PRESSURE	*** UNIT COSTS: ***			8.50	267.42	0.65	85.00	4.25	357.31
WC=1100 SENSOR	1.00 EA EPIPA			9	267	1	85	4	357
16962 PRESSURE SWITCHES									
CD=3 EL 1001 PRESSURE SWITCH	*** UNIT COSTS: ***			2.00	62.79	1.40	80.00	4.00	148.19
WC=1100	3.00 EA EESMA			6	188	4	240	12	445
16963 FLOW SWITCHES									
CD=3 EL 1001 FLOW SWITCH	*** UNIT COSTS: ***			2.50	82.53	0.32	190.00	9.50	282.35
WC=1100	1.00 EA EELEB			3	83	0	190	10	282
CD=3 EL 1002 FLOW SWITCH	*** UNIT COSTS: ***			5.00	137.72	2.02	0.00	0.00	139.73
WC=1100	1.00 EA MSPFB			5	138	2	0	0	140
16991 6000 CABINET									
CD=3 EL 6001 DATA TERMINAL CABINET	*** UNIT COSTS: ***			2.50	82.53	0.32	350.00	17.50	450.35
WC=1100	1.00 EA EELEB			3	83	0	350	18	450
CD=3 EL 6002 INSTRUMENT SHELTER	*** UNIT COSTS: ***			2.50	82.53	0.32	125.00	6.25	214.10
WC=1100	1.00 EA EELEB			3	83	0	125	6	214
16991 7000 SOFTWARE									
CD=3 EL 7001 PROGRAMMING POINTS FOR EMCS	*** UNIT COSTS: ***			1.25	41.26	0.16	30.00	1.50	72.92
WC=1100	32.00 EA EELEB			40	1,320	5	960	48	2,334
TOTAL DIVISION 16 ELECTRICAL				195	6,196	47	4,850	242	11,335
TOTAL FACILITY AA. ELECTRICAL				195	6,196	47	4,850	242	11,335
TOTAL BID ITEM 1. BUILDING TO THE 5 FOOT LINE				195	6,196	47	4,850	242	11,335
TOTAL BASE BID				195	6,196	47	4,850	242	11,335
TOTAL ADDITIVE				0	0	0	0	0	0
TOTAL INCL ADD ENERGY SAVINGS OPPORTUNITY SURVY				195	6,196	47	4,850	242	11,335

*** END OF DETAIL REPORT ***
CURRENCY in DOLLARS

CREW ID: ORL290

4-114
PROJECT ID: 270210

Fri 24 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-10: BUILDING 2702

TIME 10:44:11

PROJECT NOTES

SUMMARY PAGE 1

PROJECT NOTES

ECO-10: EMCS EXPANSION

SCOPE OF WORK: EVALUATE THE EXPANSION OF THE EXISTING EMCS SYSTEM TO SELECTED
FACILITIES AT FORT CAMPBELL.

Fri 24 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
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ID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 2

BID ITEM 1 BUILDING TO THE 5 FOOT LINE

BASE BID

ID	FACILITY		COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHR FCTR	TOTAL COST	UNIT COST
AA	ELECTRICAL									
		1.00 EA	11,335	10.0% 1,134	0.0% 0	7.5% 935	2.5% 335	0.0% 0	13,739	13739.00
BID ITEM TOTAL		1.00 EA	11,335	1,134	0	935	335	0	13,739	13739.00

CREW ID: ORL290

CURRENCY in DOLLARS

4-116
PROJECT ID: 270210

Fri 24 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
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BID ITEM AND FACILITY SUMMARY

SUMMARY PAGE 3

BID ITEM 2 SITEWORK

BASE BID

ID FACILITY	COST TO PRM	OVERHEAD	HOME OFC	PROFIT	BOND	OTHER FCTR	TOTAL COST	UNIT COST
TOTAL BASE BID	11,335	1,134	0	935	335	0	13,739	
TOTAL ADDITIVE	0	0	0	0	0	0	0	
TOTAL INCL ADD	11,335	1,134	0	935	335	0	13,739	

CREW ID: ORL290

CURRENCY in DOLLARS

4-117
PROJECT ID: 270210

Fri 24 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
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PROJECT CWE SUMMARY

SUMMARY PAGE 4

ID	BID ITEM	QUANTITY	UOM	BASE BID	ADDITIVE	TOTAL COST	UNIT COST
1.	BUILDING TO THE 5 FOOT LINE	1.00	EA	13,739		13,739	13739.00
TOTAL CURRENT CONTRACT COST				13,739	0	13,739	
Cost Growth from 09/93 to 09/94 Index Values: 0000 0000		0.0%		0	0	0	
ESCALATED CONTRACT COST				13,739	0	13,739	
Government-Furnished Property				0		0	
SUBTOTAL				13,739	0	13,739	
Contingencies		10.0%		1,374	0	1,374	
SUBTOTAL				15,113	0	15,113	
SIOH (S&A)		5.0%		756	0	756	
CURRENT WORKING ESTIMATE				15,869	0	15,869	

Estimated Construction Time 365 Days

Fri 24 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
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CONTRACTOR DIRECT SUMMARY

SUMMARY PAGE 5

ID	CONTRACTOR	PM	QUANTITY	UOM	MANHRS	LABOR	EQUIPMENT	MAT	W/TX	** TOTAL DIRECT * AMOUNT PCT	* SUBCON * W/OH&P	SUBTOTAL
AA	GENERAL/PRIME		1.00	EA	195	6,196	47	5,092		11,335 100.0%	0	11,335
	TOTAL DIRECT				195	6,196	47	5,092		11,335 100.0%		

Fri 24 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-10: BUILDING 2702

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CONTRACTOR INDIRECT SUMMARY

SUMMARY PAGE 6

-----		*** OVERHEAD ***		-----		**** PROFIT ****		-----		***** TOTAL CONTRACT *****			
ID	CONTRACTOR	PM	SUBTOTAL	AMOUNT	PCT	HOFC%	AMOUNT	PCT	BOND%	OTHR%	AMOUNT	PCT	UNIT COST

AA	GENERAL/PRIME		11,335	1,134	10.0%	0.0	935	7.5%	2.5%	0.0%	13,739	100.0%	13738.99
				-----			-----						
				1,134	10.0%		935	7.5%					

CREW ID: ORL290

CURRENCY in DOLLARS

4-120
PROJECT ID: 270210

Fri 24 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
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CSI DIVISION SUMMARY

SUMMARY PAGE 7

ID CSI DIVISION	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
16 ELECTRICAL	195	6,196	47	4,850	242	11,335
TOTAL DIRECT	195	6,196	47	4,850	242	11,335

CREW ID: ORL290

CURRENCY in DOLLARS

4-121
PROJECT ID: 270210

Fri 24 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-10: BUILDING 2702

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SYSTEMS SUMMARY

SUMMARY PAGE 8

ID SYSTEM	MANHOURS	LABOR	EQUIPMENT	MATERIAL	SALES TAX	***** TOTAL * DIRECT
11 INTERIOR ELECTRICAL	195	6,196	47	4,850	242	11,335
TOTAL DIRECT	195	6,196	47	4,850	242	11,335

CREW ID: ORL290

CURRENCY in DOLLARS

4-122
PROJECT ID: 270210

Fri 24 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-10: BUILDING 2702

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EQUIPMENT SUMMARY

SUMMARY PAGE 9

EQUIP DESCRIPTION	LIFE HRS	TL HRLY	OWNRSH	OWNS	OVTM	OWNRSH	EXPENSE	HRLY RATE	UPB RATE	HOURS	TOTAL COST
EMI20 SMALL TOOLS								1.40	1.40	33	47
TOTAL PROJECT EQUIPMENT HOURS										33	47

Fri 24 Sep 1993

U.S. ARMY CORPS of ENGINEERS M-CACES
ENERGY SAVINGS OPPORTUNITY SURVY / FT CAMPBELL, KY
ECO-10: BUILDING 2702

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LABOR SUMMARY

SUMMARY PAGE 10

CRAFT DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	HRLY RATE	UPB RATE	**** HOURS	**** TOTAL COST
LELEC ELECTRICIANS	20.50	0.0%	24.0%	7.49	0.00	32.91	25.79	164	5,282
LSHMT SHEET METAL WORKERS	19.90	0.0%	24.0%	5.20	0.00	29.88	25.06	18	538
LSPFI STEAM/PIPEFITTERS	20.95	0.0%	24.0%	3.85	0.00	29.83	26.12	13	376
TOTAL PROJECT MANHOURS								195	6,197

* * * END OF SUMMARY REPORT * * *